SITE INVESTIGATION REPORT
AREA OF CONCERN NO. 24
C-52A AERIAL OVERSPRAY SITE

FOR
EGLIN AIR FORCE BASE, FLORIDA

CONTRACT NO. DACW45-94-D-0002
DELIVERY ORDER NO. 2

Prepared For
Eglin Air Force Base
Eglin AFB, Florida

Prepared By
Rust International, Inc.
Fort Walton Beach, Florida

I hereby submit that I am currently registered in good standing as a Professional Geologist in the state of Florida. To the best of my knowledge, all work associated with this Site Investigation was performed in accordance with applicable state and federal regulations, project Work Plans, and accepted professional practices.

Richard L. Burdine, P.G.
Florida P.G. # 1863

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Air Force Development Test Center
Air Force Materiel Command
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Rust International, Inc.
Fort Walton Beach, Florida

Under Contract To
U.S. Army Corps of Engineers
Omaha, Nebraska

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
2,4-D	(2,4-dichlorophenoxy)acetic acid
2,4,5-T	(2,4,5-trichlorophenoxy)acetic acid
40 CFR	Volume 40 of the Code of Federal Regulations
AOCs	Areas of Concern
ARARs	Applicable and Relevant or Appropriate Requirements
Bldg.	Building
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chain of Custody
CompQAP	Florida Comprehensive QA Plan
COPCs	Contaminants of Potential Concern
DoD	Department of Defense
Eglin	Eglin Air Force Base
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ER	Environmental Restoration
ES	Engineering-Science, Inc.
ESOPs No. 1 through 14	Eglin Standard Operating Procedures
ESOP No. 1	Site Access and Clearance
ESOP No. 2	Field Records and Documentation
ESOP No. 3	Sample Nomenclature and Control
ESOP No. 4	Geophysical Investigation Methods
ESOP No. 5	Quality Control Procedures for Field Equipment
ESOP No. 6	Surface Water and Sediment Sampling
ESOP No. 7	Standard Field Parameter Measurements
ESOP No. 8	Soil Investigation
ESOP No. 9	Field Screening Techniques
ESOP No. 10	Subsurface Water Investigation
ESOP No. 11	Surveying
ESOP No. 12	Abandonment

ACRONYMS (CONTINUED)

ESOP No. 13	Standard Cleaning and Decontamination Procedures
ESOP No. 14	Investigation Derived Waste
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FSP	Field Sampling Plan
GC	Gas Chromatograph
GCT	Gustin, Cothern, & Tucker, Inc.
HSAs	hollow stem augers
HSP	Basewide Health and Safety Plan
IRP	Installation Restoration Program
mg/kg	milligrams per kilogram
MR	Missouri River Laboratory
MSL	mean sea level
NAD	North American Datum
NCP	National Contingency Plan
NGVD	National Geodetic Vertical Datum
OVA	Organic Vapor Analyzer
PAs	Preliminary Assessments
PCBs	Polychlorinated Biphenyls
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
QA	Quality Assurance
QAPjP	Quality Assurance Project Plan
QAPP	Basewide Quality Assurance Program Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
R.R.	Range Road
Rust	Rust International Inc.
S.R.	State Route

ACRONYMS (CONTINUED)

SIs	Site Investigations
SSHP	Site Safety and Health Plans
SVOCs	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

The U.S. Army Corps of Engineers, Omaha District (USACE), has retained Rust International Inc. (Rust) to perform Site Investigations (SIs) at multiple sites for Eglin Air Force Base (Eglin), Florida. The purpose of the SIs at Eglin is to determine the presence or absence of environmental contamination at various Areas of Concern (AOCs), where past activities indicate the potential for releases of hazardous and/or petroleum-related substances to the environment. Phase I Record Searches and Preliminary Assessments (PAs) have been conducted at most of the sites through the U.S. Air Force Installation Restoration Program (IRP).

The SIs performed at Eglin were conducted under the IRP, which was established to meet the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as defined within the National Contingency Plan (NCP). The SIs were also conducted to comply with the substantive requirements of a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) in conjunction with Eglin's RCRA Part B permit. Data gathered during the SI may also be used to evaluate potential petroleum releases as required by Florida Department of Environmental Protection (FDEP), as defined by Chapter 62-770, Florida Administrative Code (FAC). If any AOC is defined as a potential petroleum release site as defined by Volume 40 of the Code of Federal Regulations (40 CFR), Chapter 280, subsequent actions will be conducted in accordance with the *Agreement Between FDEP and Eglin and Hurlburt Field Concerning the Remediation of Petroleum Contamination* (August 10, 1995).

All SI work was conducted in accordance with the Basewide Environmental Restoration (ER) scoping documents prepared for Eglin and approved by the Environmental Protection Agency (EPA) and FDEP. These include the Basewide ER Work Plan, which includes Eglin Standard Operating Procedures (herein referred to as ESOPs No. 1 through 14); the Basewide Quality Assurance Program Plan (QAPP); and the Basewide Health and Safety Plan (HSP), which includes site-specific Site Safety and Health Plans (SSHP) for each AOC. The work also conformed to the site-specific Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPjP) for AOC No. 24, contained in the SI Work Plan Addendum, and conformed to Rust's approved Florida Comprehensive QA Plan (CompQAP).

This Report presents the background information, investigation procedures, results, conclusions, and recommendations associated with the SI activities conducted at AOC No. 24 C-52A Aerial Overspray Site at Eglin.

1.1 OBJECTIVES

The primary objectives of the SI at AOC No. 24 are as follows:

- Determine the presence or absence of environmental contamination. If contaminants are present, evaluate the concentrations with respect to Applicable and Relevant or Appropriate Requirements (ARARs), and/or guidance concentrations and identify Contaminants of Potential Concern (COPCs).
- If COPCs are not identified, provide documentation to support no further action.
- If COPCs are present, provide sufficient data to design an effective strategy for the following actions: 1) interim removal actions (if appropriate); 2) further evaluation of the site consistent with RCRA and CERCLA; 3) evaluation and corrective actions through FDEP, Chapter 62-770 regulations for petroleum sites (if appropriate); and/or 4) support of no further action if the site does not pose a significant risk to human health or the environment.

1.2 APPROACH

The approach adopted to meet the SI objectives for AOC No. 24 included the following tasks:

- Installation of three groundwater monitoring wells to an approximate depth of 20 to 30 feet below land surface (bls).
- Collection and analyses of the groundwater samples from the monitoring wells. The laboratory analyses included Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-Volatile Organic Compounds (SVOCs), TCL Pesticides/Polychlorinated Biphenyls (PCBs), herbicides, Target Analyte List (TAL) arsenic, and/or malathion.

All monitoring wells were installed in accordance with Florida permitting requirements by a certified water well driller. Sampling and analyses were conducted according to the approved Basewide ER Work Plan and QAPP.

To determine the presence or absence of contamination, Eglin has adopted an approach suggested by the FDEP for establishing COPCs (Figure 1.1) based on comparison of SI data to a comprehensive list of ARARs and guidance concentrations. This two-tiered screening approach has been documented in a separate volume entitled *Guidelines for COPC Identification at Eglin AFB* (Rust, November, 1995), which is incorporated into this SI Report by reference. The *Guidelines for COPC Identification at Eglin AFB* provides a discrete list of *Tier I Primary Screening Levels* for each of four media: soil, groundwater, surface water, and sediment. The Tier I Screening Level for each compound is the minimum ARAR, if an ARAR exists, or the

minimum guidance concentration, if no ARAR exists, for each of the four media. For the medium sampled at AOC No. 24, Eglin has applied the FDEP screening approach as follows:

1. For each substance, if all applicable site-specific concentrations do not exceed the Tier I Screening Levels, that particular substance is not identified as a COPC.
2. If any concentration exceeds a Tier I Screening Level, a *Tier II* screen is performed by comparing the data to appropriate background concentrations. If the concentration does not exceed the background concentration, the substance is not identified as a COPC.
3. If the concentration exceeds both the Tier I Screening Level and the Tier II Screening Level concentration (if available), the substance is identified as a COPC.
4. If any COPC is identified at an AOC, presence of potential contamination is confirmed.
5. If no COPC is identified, no presence of contamination is determined. Therefore, absence of contamination will be assumed.

Application of the method to the AOC No. 24 SI is discussed in Sections 4.0 and 5.0.

2.0 BACKGROUND INFORMATION

The following background information has been compiled from the *Investigation of Areas of Concern-Final Report, C-52A Aerial Overspray Site,* by Engineering-Science, Inc. (ES, 1994) and augmented by information gathered during the SI.

2.1 SITE LOCATION AND HISTORY

AOC No. 24 is located in Walton County, Florida, approximately 12 miles northeast of the city of Niceville along the southeastern perimeter of C-52 Test Range (Figures 2.1 and 2.2). To access AOC No. 24 from the East Gate of Eglin Main Base, take State Route (S.R.) 20 East, travel 8.0 miles to Range Road (R.R.) 218. Turn left (northeast) onto R.R. 218 and travel 7.0 miles to the intersection of R.R. 218 and 218B. Turn left (north) off of R.R. 218 onto R.R. 218B and travel approximately 0.5 miles to the intersection of R.R. 222. At the intersection of R.R. 222 turn right (east) and travel 0.1 miles. Turn left (north) onto the first dirt road after the designated parking area for C-52 control tower. Travel 0.1 miles into the central area of AOC No. 24. The approximate geographic coordinates of the site are 30°32'02" latitude and 86°19'02" longitude.

The C-52A Aerial Overspray Site was initially identified in 1990 as a potential source of environmental contamination associated with aerial dissemination of herbicide orange. A site reconnaissance was conducted by ES on December 12, 1991.

The following paragraphs describe the site as it appeared during the 1991 site reconnaissance (ES, 1994). The site is situated on a relatively flat, treeless tract of land approximately 165 acres in size, roughly bounded by R.R. 222 to the south and an abandoned east-west runway to the north. The eastern site boundary is generally defined by Basin Creek (Figure 2.3). The spray area is characterized by sparse scrub vegetation interspersed with bare sandy areas. Several intact rusty drums were observed on the southwestern edge of the site. Interviews were conducted with Mr. Charlie Ray and Mr. Floyd Hutto (Eglin Test Range employees for 39 and 41 years of service, respectively). They explained that the overspray area was used to dispose of herbicides following scheduled test missions that were aborted over the C-52 Test Grid, which is located 0.5 miles south of the site. This primarily occurred when climatic conditions were not in accordance with test protocol. As a result, the aircraft would release their loads above the overspray area. According to Mr. Ray, records of the frequency of this practice and the quantity of herbicides released were not kept, but that the testing at C-52 Test Grid was conducted during the 1960s and early 1970s.

2.2 PHYSICAL SETTING

This section presents a brief description of the local physiography, geology, and hydrogeology of the site. A detailed discussion of regional physiography, surface drainage features, soils, geology, hydrogeology, and water use is presented in Section 2.0 of the Basewide ER Work Plan.

2.2.1 Physiography

The site is located within the Gulf Coastal Lowlands of the Gulf Coastal Plain Physiographic Province (Scott, 1992). The area surrounding the site is characterized by flat to rolling uplands, with elevations ranging from 40 to 90 feet above mean sea level (MSL). Perennial and ephemeral creeks cut the uplands within relatively steep ravines. The relief between the bottom of the ravines and the uplands is generally about 50 feet. The site itself has low relief (Figures 2.2 and 2.3).

Presently, AOC No. 24 has a good vegetative cover of grasses and dense briars with minimal barren patches. A mixed stand of small hardwoods and softwoods border the eastern perimeter of the site.

Storm water drainage is to the east-southeast toward Basin Creek, which is approximately 400 to 700 feet from the site. Basin Creek is formed by the confluence of Bay Head Branch and Coon Head Branch Creeks located about 7,000 feet due north of the site. Basin Creek lies in a moderately steep ravine. The surface water is at an approximate elevation of 40 feet above MSL near the site (Figures 2.2 and 2.3).

2.2.2 Geology

Site specific lithology and geology is presented in Section 4.0. Regional geology is presented in the Basewide ER Work Plan.

2.2.3 Hydrogeology

The surficial aquifer beneath this site extends to an approximate depth of 10 to 50 feet bls (Hayes and Barr, 1983). The Pensacola Clay separates the surficial aquifer from the underlying Floridan aquifer and is approximately 200 feet thick and extends to a depth of approximately 210 to 250 feet bls (Maslia and Hayes, 1988). The surficial aquifer occurs under water table conditions. The direction of groundwater flow in the surficial aquifer is to the east, toward Basin Creek. This is discussed in more detail in Section 4.2.

East Range Base Well No. 35 is located approximately one mile southwest of the site within Building No. 8776. This well serves approximately 35 personnel and is completed within the Floridan aquifer system at a depth of 382 feet bls (ES, 1994). In addition, Well No. 33 is located approximately 100 feet south of the site within Bldg. No. 8722. This well serves approximately

135 personnel associated with the range control facility and is completed within the Floridan aquifer system at a depth of 410 feet bls (ES, 1994). Both wells are not considered potential targets for contaminant migration from AOC No. 24 due to both the thickness (approximately 200 feet) of the Pensacola Clay and the well locations with respect to groundwater flow directions. No other private or municipal wells are known to exist within one mile of the site (USACE, 1994).

2.3 PREVIOUS INVESTIGATIONS

AOC No. 24 was identified as a potential AOC during a PA and described in the *Investigation of Areas of Concern – Final Report, C-52A Aerial Overspray Site* (ES, 1994). PA activities included a review of historical data, interviews, and a site reconnaissance.

Past investigations at the C-52A Aerial Overspray site have included collection of sediment and biota samples from Basin and Mullet Creeks, which drain the site. These samples were analyzed for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD, a contaminant produced during manufacture of herbicides orange and purple). No 2,3,7,8-TCDD was detected in any of these samples above the laboratory detection limits. The results of this investigation indicated that further assessment of the stream sediments and biota was not necessary. This work was performed in the middle and late 1980s (ES, 1993).

Additional sampling was conducted in 1992 to confirm the absence or presence of herbicide-related constituents in surficial soils at the site. Thirty soil samples (zero to six inches in depth) were collected, using a grid pattern across the site. Only two samples of the thirty had detectable concentrations of potential site contaminants. Arsenic was detected in one sample from the northwestern edge of the site along the east-west runway at 3.3 mg/kg. Dioxin was detected in a different sample collected from the eastern edge of the site at a concentration of 0.325 ug/kg. An evaluation of human health risks concluded that these concentrations did not pose an unacceptable risk to base workers in the area. The results of the 1992 investigation and the risk evaluation indicated that further assessment of soils in the C-52A Aerial Overspray Site was not necessary (ES, 1993).

During the 1992 investigation, groundwater in the vicinity of the C-52A Aerial Overspray Site was not sampled. However, in general, herbicide orange constituents [(2,4-dichlorophenoxy) acetic acid (2,4-D), (2,4,5-trichlorophenoxy)acetic acid (2,4,5-T)] and related contaminants (arsenic and dioxin) do not have a strong affinity for the water matrix and are relatively immobile in soil.

3.0 INVESTIGATION PROCEDURES

This section describes the activities and investigative procedures used to complete the SI for AOC No. 24.

3.1 MONITORING WELL INVESTIGATION

3.1.1 Monitoring Well Installation and Development

Three groundwater monitoring wells (24-MW-01, 24-MW-02, and 24-MW-03) were installed at AOC No. 24 on June 20, 22, and 23, 1995. The locations of these wells are presented in Figure 3.1. Drilling and monitoring well installation activities were performed by AE Drilling, Inc. of Niceville, Florida (Florida License No. 2598).

Monitoring well locations were selected to determine the impact (if any) of historical aerial overspray practices on the shallow groundwater quality. AOC No. 24 is located within the C-52 Test Range which is an active munitions Test Range. Therefore, the final locations of monitoring wells were restricted to areas in which the Eglin Explosive Ordnance Disposal Division (EOD) could effectively clear prior to mobilization of drilling equipment.

Monitoring wells 24-MW-01 and 24-MW-03 were placed based upon an evaluation of site topography and an inferred groundwater flow direction. Monitoring well 24-MW-02 was located downgradient of a small fenced-in former drum storage area, to monitor the impact to groundwater (if any) of historical drum handling/storage practices at AOC No. 24.

The boreholes for 24-MW-01, 24-MW-02, and 24-MW-03 were advanced with 6.25-inch inside diameter (ID) hollow stem augers (HSAs) to depths of 20 to 33 feet bls. Split-spoon soil samples were collected for lithologic descriptions from borehole 24-MW-01 continuously from land surface to approximately 10 feet bls and then at 5-foot intervals thereafter. Split-spoon samples from boreholes 24-MW-02 and 24-MW-03 were collected at 5-foot intervals from land surface to the bottom of the exploration. The boring logs are presented in Appendix A.

The monitoring wells were constructed of 2-inch ID Schedule 40 PVC riser material with a 9.5-foot section of 0.010-inch continuous-wrapped screen at the bottom of the well. Monitoring wells 24-MW-01, 24-MW-02, and 24-MW-03 were installed to total depths of 28.1, 18.6, and 26.1 feet bls, respectively. Monitoring well construction and installation procedures were in accordance with ESOP No. 10. A summary of well construction details is presented in Table 3.1. The Monitoring Well Construction Detail forms are presented in Appendix B.

Monitoring wells 24-MW-01 and 24-MW-02 were developed on June 23, 1995. Monitoring well 24-MW-03 was developed on June 26, 1995. Monitoring well development was conducted in

accordance with methods outlined in ESOP No. 10, except as otherwise noted. The wells were developed with a stainless steel bailer and a Grundfos™ submersible pump. The bailer was used initially to surge the well and remove gross sand and silt grains from inside the well. The submersible pump was then utilized to surge and overpump the well.

Due to the high turbidity of groundwater at this site, it was necessary to remove a large volume of water during development. Although ESOP No. 10 requires the field parameters be measured once every well volume, it was more practical and meaningful to measure the parameters at greater volume intervals. Therefore, the field parameters (pH, specific conductivity, temperature, and turbidity) were measured following the removal of approximately every 30 gallons or 5 casing volumes. The results of the field parameter measurements are included in the Monitoring Well Development Logs presented in Appendix C. Samples of the initial and final development water were collected from the monitoring wells. These samples were labeled and photographed as part of the well development documentation and are filed at the Rust office in Fort Walton Beach, Florida.

3.1.2 Groundwater Sampling

Three groundwater samples (24-MW-01, 24-MW-02, and 24-MW-03) were collected using new, disposable Teflon™ bailers. A trip blank (24-MW-02-c) was submitted to the laboratory in association with the groundwater sample 24-MW-02. Prior to inorganics (metals) sample collection and following collection of all other analytical parameters, the groundwater in the monitoring wells was allowed to settle. After approximately one hour, the bailer was gently lowered into the water column in an attempt to collect a non-turbid groundwater sample for inorganics analyses.

All samples were collected in accordance with ESOP No. 10. Sample management and chain-of-custody procedures conformed to ESOP No. 3.

3.1.3 OVA Headspace Analyses

Split-spoon soil samples collected during the drilling operations were screened in the field for VOCs with an OVA equipped with a flame ionization detector. The methods of this screening process conformed to those presented in ESOP No. 9. If a meter deflection was recorded during the initial measurement, the headspace was reanalyzed with the activated carbon filter installed on the OVA. The activated carbon removes the heavier VOCs from the sample, thus the naturally-occurring, lighter, methane gas that may or may not be present is measured. The filtered value was then subtracted from the total unfiltered instrument reading, to compute the VOC concentration in methane-equivalent readings. A carbon filter was not used for the initial

headspace analysis. The results of these headspace readings are presented in Headspace Screening Logs presented in Appendix D.

3.2 LABORATORY CHEMICAL ANALYSES

This section describes the laboratory chemical analyses performed on the samples associated with AOC No. 24. All sampling and analyses were conducted in accordance with the QAPP, the site-specific FSP and QAPjP, and the CompQAP. Laboratory analyses were performed and chemical data were generated by Quanterra Laboratories of Tampa, Florida, approved by the State of Florida, under approved Florida State laboratory specific CompQAPs, and validated by the USACE Missouri River (MR) Laboratory.

Groundwater samples were analyzed as described below in accordance with the following methodologies:

Analytical Suite	Methodology
TCL VOCs*	SW-846 Method 5030/8260
TCL SVOCs*	SW-846 Method 3510, 3520/8270
TCL Pesticides/PCBs*	SW-846 Method 8080
Malathion*	SW-846 Method 8141
Arsenic*	SW-846 Method 6010
Herbicides	SW-846 Method 8151

*Indicates components of a "full scan" analysis.

Also, groundwater samples from permanent monitoring wells were analyzed using the following additional analytical methods to achieve the required lower detection limits for certain SVOC compounds:

Compound	Methodology
Benzo(a)anthracene*	SW-846 method 3510, 3520/8310
Benzo(a)pyrene*	SW-846 method 3510, 3520/8310
Benzo(b)fluoranthene*	SW-846 method 3510, 3520/8310
Benzo(k)fluoranthene*	SW-846 method 3510, 3520/8310
Chrysene*	SW-846 method 3510, 3520/8310
Dibenz(a,h)anthracene*	SW-846 method 3510, 3520/8310
Hexachlorobenzene*	SW-846 method 3510, 3520/8080
Indeno(1,2,3-cd)pyrene*	SW-846 method 3510, 3520/8310
Naphthalene*	SW-846 method 3510, 3520/8310
Pentachlorophenol*	SW-846 method 8151

*Indicates components of a "full scan" analysis.

Groundwater sample 24-MW-02 was analyzed for TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, malathion, herbicides, and TAL Arsenic. A trip blank (24-MW-02-c) was submitted to the laboratory in association with 24-MW-02 and analyzed for TCL VOCs. Groundwater samples 24-MW-01 and 24-MW-03 were analyzed for herbicides, malathion, and TAL Arsenic. A summary of the laboratory analyses performed on the samples is presented in Table 3.2.

3.3 DECONTAMINATION PROCEDURES

All sampling and drilling equipment was decontaminated in accordance with ESOP No. 13 prior to its use at another sampling location or borehole. Drilling equipment such as hollow stem augers, AW rods, and drill rigs were decontaminated with a high pressure steam cleaning system. The PVC well materials were also steam cleaned immediately prior to installation into the borehole.

3.4 SURVEYING

The sampling points associated with AOC No. 24 were surveyed by Gustin, Cothern, and Tucker, Inc. (GCT), a surveying firm licensed in the state of Florida. Both vertical and horizontal control surveying were performed at each sampling point. For the monitoring wells, the elevations of both the marked top of the well casing and the ground surface were surveyed.

Both latitude and longitude coordinates and the state plane coordinates were calculated. Both of these coordinate systems are based on North American Datum (NAD) 1983 Geographic Coordinates. The vertical datum is the National Geodetic Vertical Datum (NGVD) of 1929. GCT has certified that the positions meet or exceed Third-order, class I (1:10,000) horizontal accuracy and Third-order Vertical accuracy. A summary of the survey data is presented in Appendix E.

3.5 QUALITY ASSURANCE/QUALITY CONTROL

The analytical program requirements established for SIs conducted at Eglin were met in accordance with the Basewide QAPP and the Rust ComQAPP. Specific SI Quality Assurance requirements were met in accordance with the site-specific FSP and the QAPjP.

Analytical data validation was conducted by The Earth Technology Corporation of Alexandria, Virginia, under subcontract to Rust. All validation reports were reviewed by the Rust QA Manager. The final validation reports are presented in Appendix F. Supporting Quality Assurance documents including Chain of Custody (COC) Records, Laboratory Logbooks, Internal Quality Control Records, and Laboratory Certifications are maintained by Quanterra Laboratories, Tampa, Florida. Standard Operating Procedures and Field Quality Control Records are maintained at the Rust-Ft. Walton Beach office. All records are available for review upon request.

The Quality Assurance/Quality Control (QA/QC) program addresses all field and laboratory activities and was implemented on a program-wide, as opposed to a site-specific, basis. Therefore, some sites may not have QA/QC samples associated with samples from that particular AOC.

The QC program was implemented by conforming to the QAPP and ESOP requirements regarding reagent/standard preparation, equipment decontamination, sample collection, field measurements, and equipment calibration, maintenance and corrective action. Laboratory QC results are discussed within the data validation reports provided with each COC in Appendix F. The number of QC samples was calculated at a quantity of approximately 10% of all samples collected, per matrix, per analytical method, for the SI program. All QC samples were submitted to Quanterra Laboratory.

The QA program was implemented by the submission of split samples to the USACE MR Laboratory to corroborate the subcontractor laboratory data. The number of QA samples was calculated at a quantity of approximately 5% of all samples collected, per matrix, per analytical method. All QA samples were submitted to the USACE MR Laboratory. In addition, the subcontractor laboratory maintains USACE MR and Florida certifications throughout the lifetime

of the project. The measurement of QA for all SI data (as described in Section 3.0 of the QAPP) included the parameters: precision, accuracy representativeness, comparability, and completeness. The reliability and credibility of the subcontract laboratory were corroborated by the inclusion of replicate, standard, rinsate samples and trip blanks.

4.0 INVESTIGATION ACTIVITIES AND RESULTS

4.1 SOIL CHARACTERISTICS

The soil characteristics at AOC No. 24 were assessed from the split-spoon soil samples collected from the monitoring well borings.

The soils underlying AOC No. 24 are generally loose to medium dense, pale yellow to yellowish red, poorly graded fine sands. Locally, in the 24-MW-01 boring, very loose clayey sands were detected from 27 feet bls to the bottom of the exploration. A more detailed description of the soils are included in the boring logs, which are presented in Appendix A.

4.2 WATER-LEVEL MEASUREMENTS

Water-level measurements were collected from the monitoring wells 24-MW-01 through 24-MW-03 during two separate events in late summer and fall of 1995. The depth to water ranged from approximately 6 to 19 feet bls. These measurements coincide with water-level elevations ranging from 68.7 to 92.3 feet NGVD. Water-level fluctuations within the wells throughout the measurement period ranged from 0.05 to 0.77 feet. Water levels were at the highest elevations during the fall measurement. Water-level data and elevations are presented in Table 4.1. Water Level Data Summary Logs are presented in Appendix G.

The water-level measurements were evaluated for flow direction consistencies. No significant variations were detected, therefore the water-level data collected on November 14, 1995 were used to produce a water-table contour map, using geostatistical software with a triangulation algorythm (Figure 4.1). The groundwater flow direction at AOC No. 24 was found to be eastward toward Basin Creek at an approximate hydraulic gradient of 0.008 ft/ft.

4.3 GROUNDWATER QUALITY

This section summarizes the laboratory analytical data for groundwater samples collected from the three monitoring wells. The groundwater laboratory analyses are summarized in Tables 4.2 through 4.7. The laboratory certificates of analysis reports are presented in Appendix F. Groundwater sampling logs are presented in Appendix H. Table 3.2 summarizes the laboratory analyses performed on each sample.

No TCL VOCs, TCL SVOCs, TAL Arsenic, Pesticides/PCBs, malathion, or herbicides were detected above Tier I Screening Levels in applicable groundwater samples sent to the laboratory for analyses.

5.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions and recommendations of the SI conducted at AOC No. 24 C-52A Aerial Overspray Site.

5.1 SUMMARY OF RESULTS

The following summarizes environmental condition based on the SI results:

- The site is underlain by poorly graded fine sands to approximately 30 feet bls. Locally, clayey sands were detected at about 27 feet bls.
- The depth to groundwater is approximately 6 to 19 feet bls. Groundwater occurs under water table conditions. Groundwater elevations indicate the groundwater beneath the site flows eastward at a hydraulic gradient of 0.008 ft/ft toward Basin Creek. Geologic literature indicated that the depth to the underlying Pensacola Clay at the site is up to 50 feet bls. The shallow aquifer and the underlying Pensacola Clay are approximately 50 and 200 feet thick, respectively, in this area.
- No TCL VOCs, TCL SVOCs, Pesticides/PCBs, malathion, TAL arsenic, or herbicides were detected above Tier I Screening Levels in applicable groundwater samples sent to the laboratory for analyses.

5.2 COPC IDENTIFICATION

The results of COPC identification based on the SI at AOC No. 24 are summarized in Table 5.1. Two-tiered screening of groundwater data was performed as described in Section 1.2, and as documented within the *Guidelines for COPC Identification at Eglin AFB*. This process is consistent with a method suggested by FDEP, as illustrated in Figure 1.1.

The Tier I comparison of site data to the lowest appropriate ARAR or guidance concentration is documented within Tables 4.2 through 4.7. As discussed in Section 4.0, no analytical results exceed the Tier I Screening Levels.

Based on this evaluation, it is recommended that no substances be identified as COPCs for AOC No. 24.

5.3 DATA QUALITY EVALUATION

The following statements characterize the quality of SI data collected from AOC No. 24 with respect to the Data Quality Objectives (DQOs) provided in the SI Work Plan, and with respect to the overall objectives of the SI as stated in Section 1.0:

- Data validation conducted in accordance with the QAPP indicate that all analytical data are usable, as qualified by the data flags provided in Appendix F and in Tables 4.2 through 4.7.
- The SI activities consisted of the following: the installation of three permanent monitoring wells, sufficient quantity and quality of data were collected to confirm the absence of contamination by TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, malathion, TAL arsenic, and herbicides at the AOC.
- Sufficient quantity and quality of analytical, geologic, and hydrogeologic data were collected to evaluate site conditions at this AOC.

5.4 RECOMMENDATIONS FOR FURTHER ACTION

Based on the SI results, no further action is recommended for AOC No. 24.

6.0 REFERENCES

US Army Corps of Engineers, Mobile District, *Water Well Inventory, Eglin Air Force Base, Florida,* September 1994.

Department of Defense, *Relative Risk Site Evaluation Primer*, 1994.

FDEP, Eglin and Hurlburt, *Agreement Between FDEP and Eglin and Hurlburt Field Concerning the Remediation of Petroleum Contamination*, August 10, 1995.

Engineering-Science, Inc., *Installation Restoration Program, Site Investigation Report for Herbicide Orange Sites,* Eglin AFB, Volume I, 1993.

Engineering-Science, Inc., *Investigation of Areas of Concern-Final Report, C-52A Aerial Overspray Site*, Eglin AFB, 1994.

Hayes, L.R. and Barr, D.E., *Hydrology of the Sand-and-Gravel Aquifer, Southern Okaloosa and Walton Counties, Northwest Florida,* US Geological Survey, Water Resources Investigations Report 82-4110, 1993.

Maslia, M.L. and Hayes, L.R., *Hydrology and Simulated Effects of Ground-Water Development of the Floridan Aquifer System, Southwest Georgia, Northwest Florida, and Southernmost Alabama,* US Geological Survey, Professional Paper 1403-H, 1988.

Rust E&I, *Final Basewide Environmental Restoration Work Plan*, August 1995.

Rust E&I, *Final Basewide Quality Assurance Program Plan*, August, 1995.

Rust E&I, *Final Basewide Health and Safety Plan (HSP)*, March 1995.

Rust E&I, *Site Investigation Work Plan Addendum*, December 1995.

Rust E&I, *Florida Comprehensive Quality Assurance Plan, No. 880742G*, July 1995.

Rust E&I, *Guidelines for COPC Identification at Eglin AFB*, November 1995.

Scott, T.M., *A Geological Overview of Florida* in Florida Geological Survey Special Publication No. 32, Florida's Ground Water Quality Monitoring Program, Hydrogeologic Framework, June, 1992.

TABLE 3.1
MONITORING WELL CONSTRUCTION DETAILS
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

Well ID	State Plane Coordinates[1]		Ground Surface Elevation (ft., NGVD[2], 1929)	Top of Well Casing Elevation (ft., NGVD, 1929)	Casing Diameter[3] (inches)	Well Material	Total Depth (ft., bls[4])	Screen Interval Depth (ft., bls)		Screen Interval Elevation (NGVD, 1929)	
	Northing	Easting						Top	Bottom	Top	Bottom
24-MW-01	563522.652	1397657.617	88.1	90.48	2.0	Sch. 40 PVC	28.12	18.42	27.63	69.68	60.47
24-MW-02	561488.919	1394599.564	101.2	101.08	2.0	Sch. 40 PVC	18.58	8.58	18.08	92.62	83.12
24-MW-03	561467.890	1398107.337	83.9	86.89	2.0	Sch. 40 PVC	25.89	15.98	25.65	67.92	58.25

Notes:
1. State Plane Coordinates are based on North American Datum (NAD) 1983.
2. NGVD = National Geodetic Vertical Datum
3. Casing Diameter is the inside diameter (ID) of of the casing.
4. bls = below land surface

TABLE 3.2
SUMMARY OF LABORATORY ANALYSES
PERFORMED ON SAMPLES
AREA OF CONCERN NO. 24
C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FL

	LABORATORY ANALYSES					
SAMPLE DESIGNATION	**TCL VOCs[1]**	**TCL SVOCs[2]**	**TCL Pesticides/PCBs[3]**	**Malathion**	**TAL Arsenic[4]**	**Herbicides**
24-MW-01				X[5]	X	X
24-MW-02	X	X	X	X	X	X
24-MW-02-c	X					
24-MW-03				X	X	X

Notes:

1. TCL VOCs = Target Compound List Volatile Organic Compounds
2. TCL SVOCs = Target Compound List Semi-Volatile Organic Compounds
3. TCL Pesticides/PCBs = Target Compound List Pesticides/Polychlorinated Biphenyls
4. TAL Arsenic = Target Analyte List Arsenic
5. X= Sample was analyzed for noted parameters.

The methods of laboratory analyses are described in Section 3.2 of the text.

TABLE 4.1
SUMMARY OF WATER LEVEL DATA
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

Well Number	Date Measured	Top of Casing Elevation (feet, NGVD)	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet, NGVD)
24-MW-01	8/29/95	90.48	21.81	68.67
	11/14/95		21.18	69.30
24-MW-02	8/29/95	101.08	9.52	91.56
	11/14/95		8.75	92.33
24-MW-03	8/29/95	86.64	19.90	66.74
	11/14/95		19.85	66.79

Notes:
NGVD = National Geodetic Vertical Datum
TOC = Top of well casing

TABLE 4.2
ANALYTICAL SUMMARY OF TCL VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

TCL Volatile Organic Compounds	CAS Number	Analytical Method	MDL (µg/L)	24-MW-02 8/29/95 (µg/L)	24-MW-02-c 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
1,1,1-Trichloroethane	71-55-6	SW8260	0.4	< 5 /UJ/	< 5 /UJ/	200	Fed MCL	—
1,1,2,2-Tetrachloroethane	79-34-5	SW8260	0.4	< 1 /UJ/	< 1 /UJ/	0.4	MDL	—
1,1,2-Trichloroethane	79-00-5	SW8260	0.6	< 5 /UJ/	< 5 /UJ/	5	Fed MCL	—
1,1-Dichloroethane	75-34-3	SW8260	0.6	< 5 /UJ/	< 5 /UJ/	700	FL Guidance	—
1,1-Dichloroethene	75-35-4	SW8260	0.3	< 5 /UJ/	< 5 /UJ/	7	Fed MCL	—
1,2-Dichloroethane	107-06-2	SW8260	0.3	< 1 /UJ/	< 1 /UJ/	3	FL Primary MCL	—
1,2-Dichloroethene, total	540-59-0	SW8260	0.7	< 5 /UJ/	< 5 /UJ/	70	Fed MCL	—
1,2-Dichloropropane	78-87-5	SW8260	0.6	< 5 /UJ/	< 5 /UJ/	5	Fed MCL	—
2-Hexanone	591-78-6	SW8260	0.8	< 10 /UJ/	< 10 /UJ/	10	SQL	—
Acetone	67-64-1	SW8260	0.6	< 20 /UJ/	< 20 /UJ/	700	FL Guidance	—
Benzene	71-43-2	SW8260	0.3	< 1 /UJ/	< 1 /UJ/	1	FL Primary MCL	—
Bromodichloromethane	75-27-4	SW8260	0.3	< 1 /UJ/	< 1 /UJ/	0.6	FL Guidance	—
Bromoform	75-25-2	SW8260	0.3	< 1 /UJ/	< 1 /UJ/	4	FL Guidance	—
Bromomethane	74-83-9	SW8260	0.8	< 5 /UJ/	< 5 /UJ/	10	FL Guidance	—
Carbon Disulfide	75-15-0	SW8260	0.6	< 10 /UJ/	< 10 /UJ/	700	FL Guidance	—
Carbon Tetrachloride	56-23-5	SW8260	0.5	< 1 /UJ/	< 1 /UJ/	3	FL Primary MCL	—
Chlorobenzene	108-90-7	SW8260	0.4	< 1 /UJ/	< 1 /UJ/	100	FL Primary MCL	—
Chloroethane	75-00-3	SW8260	0.6	< 5 /UJ/	< 5 /UJ/	140	FL Guidance	—
Chloroform	67-66-3	SW8260	0.5	< 5 /UJ/	< 5 /UJ/	6	FL Guidance	—
Chloromethane	74-87-3	SW8260	0.7	< 1 /UJ/	< 1 /UJ/	2.7	FL Guidance	—
cis-1,3-Dichloropropene	10061-01-5	SW8260	0.5	< 1 /UJ/	< 1 /UJ/	0.5	MDL	—
Dibromochloromethane	124-48-1	SW8260	0.4	< 1 /UJ/	< 1 /UJ/	1	FL Guidance	—
Ethylbenzene	100-41-4	SW8260	0.5	< 5 /UJ/	< 5 /UJ/	30	FL Secondary MCL	—
Methyl Ethyl Ketone (2-Butanone)	78-93-3	SW8260	0.8	< 20 /R/	< 20 /R/	4200	FL Guidance	—
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	108-11-2	SW8260	1	< 10 /UJ/	< 10 /UJ/	350	FL Guidance	—
Methylene Chloride	75-09-2	SW8260	0.5	< 5 /UJ/	< 5 /UJ/	2.7	FL Guidance	—
Styrene	100-42-5	SW8260	0.5	< 5 /UJ/	< 5 /UJ/	100	Fed MCL	—
Tetrachloroethylene (PCE)	127-18-4	SW8260	0.4	< 1 /UJ/	< 1 /UJ/	3	FL Primary MCL	—
Toluene	108-88-3	SW8260	0.3	< 5 /UJ/	< 5 /UJ/	40	FL Secondary MCL	—
trans-1,3-Dichloropropene	10061-02-6	SW8260	0.4	< 1 /UJ/	< 1 /UJ/	0.4	MDL	—
Trichloroethylene (TCE)	79-01-6	SW8260	0.4	< 1 /UJ/	< 1 /UJ/	3	FL Primary MCL	—
Vinyl Chloride	75-01-4	SW8260	0.5	< 1 /UJ/	< 1 /UJ/	1	FL Primary MCL	—
Xylenes, total	1330-20-7	SW8260	0.5	< 1 /UJ/	< 1 /UJ/	20	FL Secondary MCL	—

"NA" = Not analyzed
"—" = Not applicable
A less-than symbol ("<") indicates the substance was not identified at concentrations above the MDL.
Shaded values indicate concentrations detected above the primary screening level concentration.
Date beneath the Sample ID indicates the sample collection date.
A complete description of data flag format and contents is available in the Appendices.

[1] For source of Tier I Screening Level, refer to Guidelines for COPC Indentification.

[2] Tier II Background Levels are base-wide background concentrations established in the Guidelines for COPC Identification.

TABLE 4.3
ANALYTICAL SUMMARY OF TCL SEMIVOLATILE ORGANIC COMPOUNDS IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

TCL Semivolatile Organic Compounds	CAS Number	Analytical Method	MDL (µg/L)	24-MW-02 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
1,2,4-Trichlorobenzene	120-82-1	SW8270	9	< 10 /UJ/	70	Fed MCL	—
1,2-Dichlorobenzene	95-50-1	SW8270	7	< 10 /UJ/	600	Fed MCL	—
1,3-Dichlorobenzene	541-73-1	SW8270	7	< 10 /UJ/	600	Fed MCL	—
1,4-Dichlorobenzene	106-46-7	SW8270	9	< 10 /UJ/	75	Fed MCL	—
2,4,5-Trichlorophenol	95-95-4	SW8270	8	< 10 /UJ/	8	MDL	—
2,4,6-Trichlorophenol	88-06-2	SW8270	6	< 10 /UJ/	10	FL Guidance	—
2,4-Dichlorophenol	120-83-2	SW8270	8	< 10 /UJ/	8	MDL	—
2,4-Dimethylphenol	105-67-9	SW8270	10	< 10 /UJ/	400	FL Guidance	—
2,4-Dinitrophenol	51-28-5	SW8270	19	< 50 /UJ/	30	FL Guidance	—
2,4-Dinitrotoluene	121-14-2	SW8270	0.016	< 10 /UJ/	73	RBC	—
2,6-Dinitrotoluene	606-20-2	SW8270	0.019	< 10 /UJ/	37	RBC	—
2-Chloronaphthalene	91-58-7	SW8270	8	< 10 /UJ/	560	FL Guidance	—
2-Chlorophenol	95-57-8	SW8270	8	< 10 /UJ/	35	FL Guidance	—
2-Methylnaphthalene	91-57-6	SW8270	4	< 10 /UJ/	10	SQL	—
2-Methylphenol (o-Cresol)	95-48-7	SW8270	9	< 10 /UJ/	350	FL Guidance	—
2-Nitroaniline	88-74-4	SW8270	14	< 50 /UJ/	14	MDL	—
2-Nitrophenol	88-75-5	SW8270	9	< 10 /UJ/	20	FL Guidance	—
3,3'-Dichlorobenzidine	91-94-1	SW8270	16	< 20 /UJ/	16	MDL	—
3-Nitroaniline	99-09-2	SW8270	24	< 50 /UJ/	110	RBC	—
4,6-Dinitro-2-methylphenol	534-52-1	SW8270	16	< 50 /UJ/	50	SQL	—
4-Bromophenyl Phenyl Ether	101-55-3	SW8270	6	< 10 /UJ/	10	FL Guidance	—
4-Chloro-3-methylphenol	59-50-7	SW8270	5	< 10 /UJ/	3000	FL Guidance	—
4-Chloroaniline	106-47-8	SW8270	9	< 10 /UJ/	28	FL Guidance	—
4-Chlorophenyl Phenyl Ether	7005-72-3	SW8270	8	< 10 /UJ/	10	FL Guidance	—
4-Methylphenol (p-Cresol)	106-44-5	SW8270	9	< 10 /UJ/	35	FL Guidance	—
4-Nitroaniline	100-01-6	SW8270	26	< 50 /UJ/	110	RBC	—
4-Nitrophenol	100-02-7	SW8270	15	< 50 /UJ/	15	FL Guidance	—
Acenaphthene	83-32-9	SW8270	3	< 10 /UJ/	20	FL Guidance	—
Acenaphthylene	208-96-8	SW8270	4	< 10 /UJ/	10	FL Guidance	—
Anthracene	120-12-7	SW8270	4	< 10 /UJ/	2100	FL Guidance	—
Benzo(a)anthracene	56-55-3	SW8270	3	< 10 /UJ/	0.1	Fed MCL	—
Benzo(a)anthracene	56-55-3	SW8310	0.035	< 0.1	0.1	Fed MCL	—
Benzo(a)pyrene	50-32-8	SW8270	3	< 10 /UJ/	0.2	Fed MCL	—
Benzo(a)pyrene	50-32-8	SW8310	0.049	< 0.2	0.2	Fed MCL	—
Benzo(b)fluoranthene	205-99-2	SW8270	3	< 10 /UJ/	0.2	Fed MCL	—
Benzo(b)fluoranthene	205-99-2	SW8310	0.036	< 0.2	0.2	Fed MCL	—
Benzo(g,h,i)perylene	191-24-2	SW8270	4	< 10 /UJ/	10	FL Guidance	—
Benzo(k)fluoranthene	207-08-9	SW8270	5	< 10 /UJ/	0.2	Fed MCL	—
Benzo(k)fluoranthene	207-08-9	SW8310	0.037	< 0.2	0.2	Fed MCL	—
bis(2-Chloroethoxy)methane	111-91-1	SW8270	8	< 10 /UJ/	10	FL Guidance	—
bis(2-Chloroethyl)ether	111-44-4	SW8270	8	< 10 /UJ/	8	MDL	—
bis(2-Chloroisopropyl)ether	108-60-1	SW8270	8	< 10 /UJ/	10	SQL	—
bis(2-Ethylhexyl)phthalate	117-81-7	SW8270	2.3	< 10 /UJ/	6	Fed MCL	—
Butyl benzyl phthalate	85-68-7	SW8270	8	< 10 /UJ/	100	Fed MCL	—

TABLE 4.3
ANALYTICAL SUMMARY OF TCL SEMIVOLATILE ORGANIC COMPOUNDS IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

TCL Semivolatile Organic Compounds	CAS Number	Analytical Method	MDL (µg/L)	24-MW-02 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
Carbazole	86-74-8	SW8270	6	< 10 /UJ/	7.5	FL Guidance	—
Chrysene	218-01-9	SW8270	5	< 10 /UJ/	0.2	Fed MCL	—
Chrysene	218-01-9	SW8310	0.037	< 0.2	0.2	Fed MCL	—
Di-n-butyl phthalate	84-74-2	SW8270	8	18 /J/	700	FL Guidance	—
Di-n-octyl phthalate	117-84-0	SW8270	10	< 10 /UJ/	140	FL Guidance	—
Dibenz(a,h)anthracene	53-70-3	SW8270	4	< 10 /UJ/	0.3	Fed MCL	—
Dibenz(a,h)anthracene	53-70-3	SW8310	0.038	< 0.3	0.3	Fed MCL	—
Dibenzofuran	132-64-9	SW8270	9	< 10 /UJ/	150	RBC	—
Diethyl Phthalate	84-66-2	SW8270	6	< 10 /UJ/	5600	FL Guidance	—
Dimethyl phthalate	131-11-3	SW8270	8	< 10 /UJ/	70000	FL Guidance	—
Fluoranthene	206-44-0	SW8270	4	< 10 /UJ/	280	FL Guidance	—
Fluorene	86-73-7	SW8270	3	< 10 /UJ/	280	FL Guidance	—
Hexachlorobenzene	118-74-1	SW8080	0.0068	< 1	1	Fed MCL	—
Hexachlorobenzene	118-74-1	SW8270	8	< 10 /UJ/	1	Fed MCL	—
Hexachlorobutadiene	87-68-3	SW8270	8	< 10 /UJ/	15	FL Guidance	—
Hexachlorocyclopentadiene	77-47-4	SW8270	9	< 10 /UJ/	50	Fed MCL	—
Hexachloroethane	67-72-1	SW8270	9	< 10 /UJ/	10	FL Guidance	—
Indeno(1,2,3-cd)pyrene	193-39-5	SW8270	4	< 10 /UJ/	0.4	Fed MCL	—
Indeno(1,2,3-cd)pyrene	193-39-5	SW8310	0.038	< 0.4	0.4	Fed MCL	—
Isophorone	78-59-1	SW8270	9	< 10 /UJ/	40	FL Guidance	—
N-Nitrosodi-n-propylamine	621-64-7	SW8270	7	< 10 /UJ/	7	MDL	—
N-Nitrosodiphenylamine	86-30-6	SW8270	9	< 10 /UJ/	9	MDL	—
Naphthalene	91-20-3	SW8270	2	< 10 /UJ/	6.8	FL Guidance	—
Naphthalene	91-20-3	SW8310	0.107	< 1	6.8	FL Guidance	—
Nitrobenzene	98-95-3	SW8270	5	< 10 /UJ/	9.5	FL Guidance	—
Pentachlorophenol	87-86-5	SW8270	25	< 50 /UJ/	1	Fed MCL	—
Phenanthrene	85-01-8	SW8270	4	< 10 /UJ/	10	FL Guidance	—
Phenol	108-95-2	SW8270	8	< 10 /UJ/	10	FL Guidance	—
Pyrene	129-00-0	SW8270	4	< 10 /UJ/	210	FL Guidance	—

"NA" = Not analyzed
"—" = Not applicable
A less-than symbol ("<") indicates the substance was not identified at concentrations above the MDL.
Shaded values indicate concentrations detected above the primary screening level concentration.
Date beneath the Sample ID indicates the sample collection date.
A complete description of data flag format and contents is available in the Appendices.

[1] For source of Tier I Screening Level, refer to Guidelines for COPC Indentification.

[2] Tier II Background Levels are base-wide background concentrations established in the Guidelines for COPC Identification.

TABLE 4.4
ANALYTICAL SUMMARY OF TCL PESTICIDES/POLYCHLORINATED BIPHENYLS IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

TCL Pesticides/Polychlorinated Biphenyls	CAS Number	Analytical Method	MDL (µg/L)	24-MW-02 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
Aldrin	309-00-2	SW8080	0.009	< 0.05	0.05	FL Guidance	0.0611
alpha-BHC	319-84-6	SW8080	0.015	< 0.05	0.05	FL Guidance	0.0578
alpha-Chlordane	5103-71-9	SW8080	0.028	< 2	2	Fed MCL	—
beta-BHC	319-85-7	SW8080	0.014	< 0.05	0.1	FL Guidance	—
delta-BHC	319-86-8	SW8080	0.003	< 0.05	0.05	FL Guidance	0.0598
Dieldrin	60-57-1	SW8080	0.05	< 0.1	0.1	FL Guidance	—
Endosulfan I	959-98-8	SW8080	0.05	< 0.1	220	RBC	—
Endosulfan II	33213-65-9	SW8080	0.04	< 0.1	220	RBC	—
Endosulfan Sulfate	1031-07-8	SW8080	0.037	< 0.1	0.3	FL Guidance	—
Endrin Aldehyde	7421-36-3	SW8080	0.045	< 0.1	0.1	FL Guidance	—
Endrin Ketone	53494-70-5	SW8080	0.042	< 0.05	11	RBC	—
Endrin	72-20-8	SW8080	0.05	< 0.1	0.2	RCRA	—
gamma-BHC (Lindane)	58-89-9	SW8080	0.011	< 0.05	0.2	Fed MCL	0.0503
gamma-Chlordane	5103-74-2	SW8080	0.018	< 2	2	Fed MCL	—
Heptachlor Epoxide	1024-57-3	SW8080	0.013	< 0.1	0.2	Fed MCL	0.0952
Heptachlor	76-44-8	SW8080	0.016	< 0.1	0.4	Fed MCL	—
Methoxychlor	72-43-5	SW8080	0.15	< 1	40	Fed MCL	0.987
p,p'-DDD	72-54-8	SW8080	0.065	< 0.1	0.1	FL Guidance	—
p,p'-DDE	72-55-9	SW8080	0.04	< 0.1	0.1	FL Guidance	—
p,p'-DDT	50-29-3	SW8080	0.037	< 0.1	0.1	FL Guidance	—
PCB-1016 (Aroclor 1016)	12674-11-2	SW8080	0.44	< 0.5	0.5	Fed MCL	—
PCB-1221 (Aroclor 1221)	11104-28-2	SW8080	0.43	< 0.5	0.5	Fed MCL	—
PCB-1232 (Aroclor 1232)	11141-16-5	SW8080	0.4	< 0.5	0.5	Fed MCL	—
PCB-1242 (Aroclor 1242)	53469-21-9	SW8080	0.19	< 0.5	0.5	Fed MCL	—
PCB-1248 (Aroclor 1248)	12672-29-6	SW8080	0.45	< 0.5	0.5	Fed MCL	—
PCB-1254 (Aroclor 1254)	11097-69-1	SW8080	0.4	< 0.5	0.5	Fed MCL	—
PCB-1260 (Aroclor 1260)	11096-82-5	SW8080	0.37	< 0.5	0.5	Fed MCL	—
Toxaphene	8001-35-2	SW8080	1.4	< 3	3	Fed MCL	—

"NA" = Not analyzed
"—" = Not applicable
A less-than symbol ("<") indicates the substance was not identified at concentrations above the MDL.
Shaded values indicate concentrations detected above the primary screening level concentration.
Date beneath the Sample ID indicates the sample collection date.
A complete description of data flag format and contents is available in the Appendices.

[1] For source of Tier I Screening Level, refer to Guidelines for COPC Indentification.

[2] Tier II Background Levels are base-wide background concentrations established in the Guidelines for COPC Identification.

TABLE 4.5
ANALYTICAL SUMMARY OF MALATHION IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

Pesticides	CAS Number	Analytical Method	MDL (µg/L)	24-MW-01 8/29/95 (µg/L)	24-MW-02 8/29/95 (µg/L)	24-MW-03 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
Malathion	121-75-5	SW8141	0.4	< 2	< 2	< 2	140	FL Guidance	—

"NA" = Not analyzed
"—" = Not applicable
A less-than symbol ("<") indicates the substance was not identified at concentrations above the MDL.
Shaded values indicate concentrations detected above the primary screening level concentration.
Date beneath the Sample ID indicates the sample collection date.
A complete description of data flag format and contents is available in the Appendices.

[1] For source of Tier I Screening Level, refer to Guidelines for COPC Indentification.

[2] Tier II Background Levels are base-wide background concentrations established in the Guidelines for COPC Identification.

TABLE 4.6
ANALYTICAL SUMMARY OF TAL ARSENIC IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

TAL Inorganics	CAS Number	Analytical Method	MDL (µg/L)	24-MW-01 8/29/95 (µg/L)	24-MW-02 8/29/95 (µg/L)	24-MW-03 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
Arsenic	7440-38-2	SW6010	3	10 /U/	10 /U/	10 /U/	50	Fed MCL	14.18

"NA" = Not analyzed
"—" = Not applicable
A less-than symbol ("<") indicates the substance was not identified at concentrations above the MDL.
Shaded values indicate concentrations detected above the primary screening level concentration.
Date beneath the Sample ID indicates the sample collection date.
A complete description of data flag format and contents is available in the Appendices.

[1] For source of Tier I Screening Level, refer to Guidelines for COPC Indentification.

[2] Tier II Background Levels are base-wide background concentrations established in the Guidelines for COPC Identification.

TABLE 4.7
ANALYTICAL SUMMARY OF HERBICIDES IN GROUNDWATER
AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FLORIDA

Herbicides	CAS Number	Analytical Method	MDL (µg/L)	24-MW-01 8/29/95 (µg/L)	24-MW-02 8/29/95 (µg/L)	24-MW-03 8/29/95 (µg/L)	Tier I Screening Level (µg/L)	Tier I Screening Source[1]	Tier II Background Level[2] (µg/L)
2,4 DB	94-82-6	SW8151	0.89	< 4	< 4	< 4	290	RBC	—
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	SW8151	0.03	< 1	< 1	< 1	70	FL Guidance	—
2,4-D (Dichlorophenoxyacetic Acid)	94-75-7	SW8151	0.71	< 4	< 4	< 4	70	Fed MCL	—
Dalapon	75-99-0	SW8151	1.25	< 2	2 /U/	2.2 /U/	200	Fed MCL	2.711
Dicamba	1918-00-9	SW8151	0.05	< 2	< 2	< 2	210	FL Guidance	—
Dichloroprop	120-36-5	SW8151	0.88	< 4	< 4	< 4	4	SQL	—
Dinoseb	88-85-7	SW8151	0.35	< 0.6 /R/	< 0.6 /R/	< 0.6 /R/	7	Fed MCL	—
MCPA	94-74-6	SW8151	56	< 400	< 400	< 400	1000	FL Guidance	—
MCPP	93-65-2	SW8151	55	< 400	< 400	< 400	55	MDL	—
Pentachlorophenol	87-86-5	SW8151	0.012	< 1	< 1	< 1	1	Fed MCL	—
Picloram	2/1/18	SW8151	0.012	< 1	< 1	< 1			
Silvex (2,4,5-TP)	93-72-1	SW8151	0.06	< 1	< 1	< 1	10	RCRA	—

"NA" = Not analyzed
"—" = Not applicable
A less-than symbol ("<") indicates the substance was not identified at concentrations above the MDL.
Shaded values indicate concentrations detected above the primary screening level concentration.
Date beneath the Sample ID indicates the sample collection date.
A complete description of data flag format and contents is available in the Appendices.

[1] For source of Tier I Screening Level, refer to Guidelines for COPC Indentification.

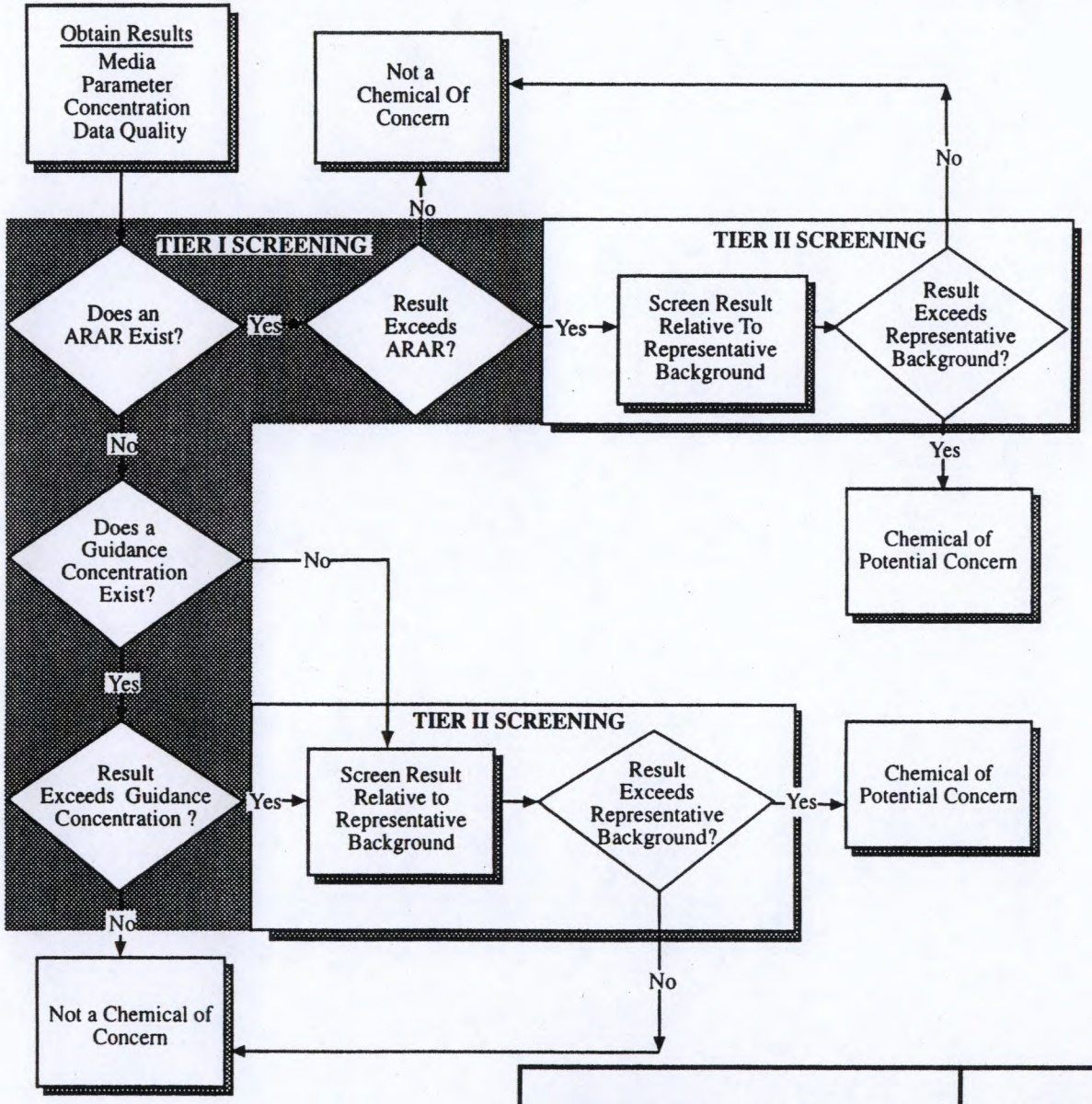
[2] Tier II Background Levels are base-wide background concentrations established in the Guidelines for COPC Identification.

TABLE 5.1
RECOMMENDED COPC IDENTIFICATION
AREA OF CONCERN NO. 24
C-52A AERIAL OVERSPRAY AREA
EGLIN AFB SITE INVESTIGATION
EGLIN AFB, FL

SUBSTANCE[1]	SOILS EVALUATION					GROUNDWATER EVALUATION					RECOMMENDATION	
	Max. Conc. (mg/kg)	Tier I Screening Level (mg/kg)	Tier II Back-ground[2] (mg/kg)	Exceeds Tier I?	Exceeds Tier II?	Max. Conc. (ug/L)	Tier I Screening Level (ug/L)	Tier II Back-ground[2] (ug/L)	Exceeds Tier I?	Exceeds Tier II?	Identify as COPC?	Rationale
VOCs	NA [3]								NE [4]		None	
SVOCs	NA								NE		None	
Pesticides/PCBs	NA								NE		None	
Malathion	NA								NE		None	
TAL Arsenic	NA								NE		None	
Herbicides	NA								NE		None	

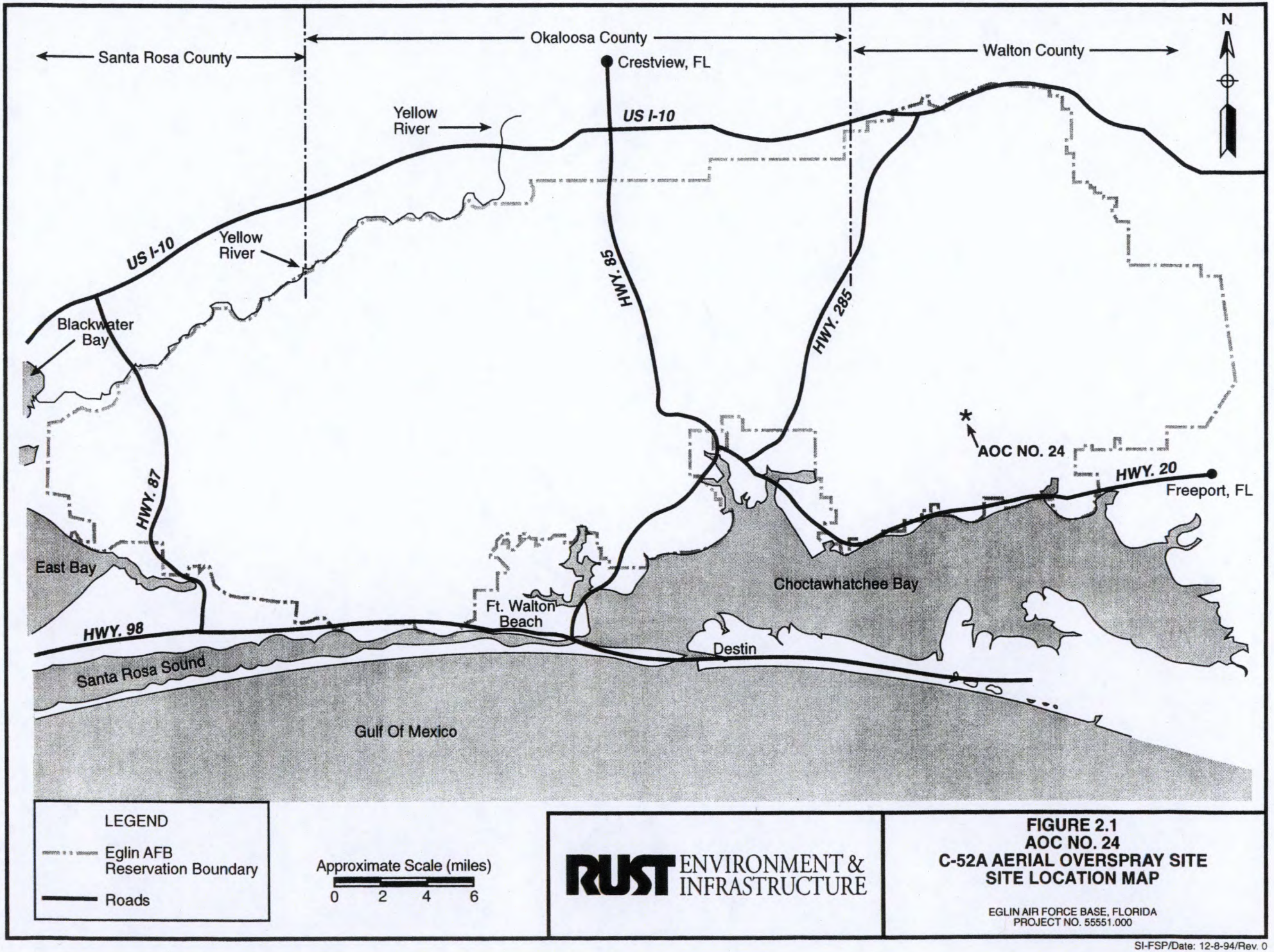
Footnotes:

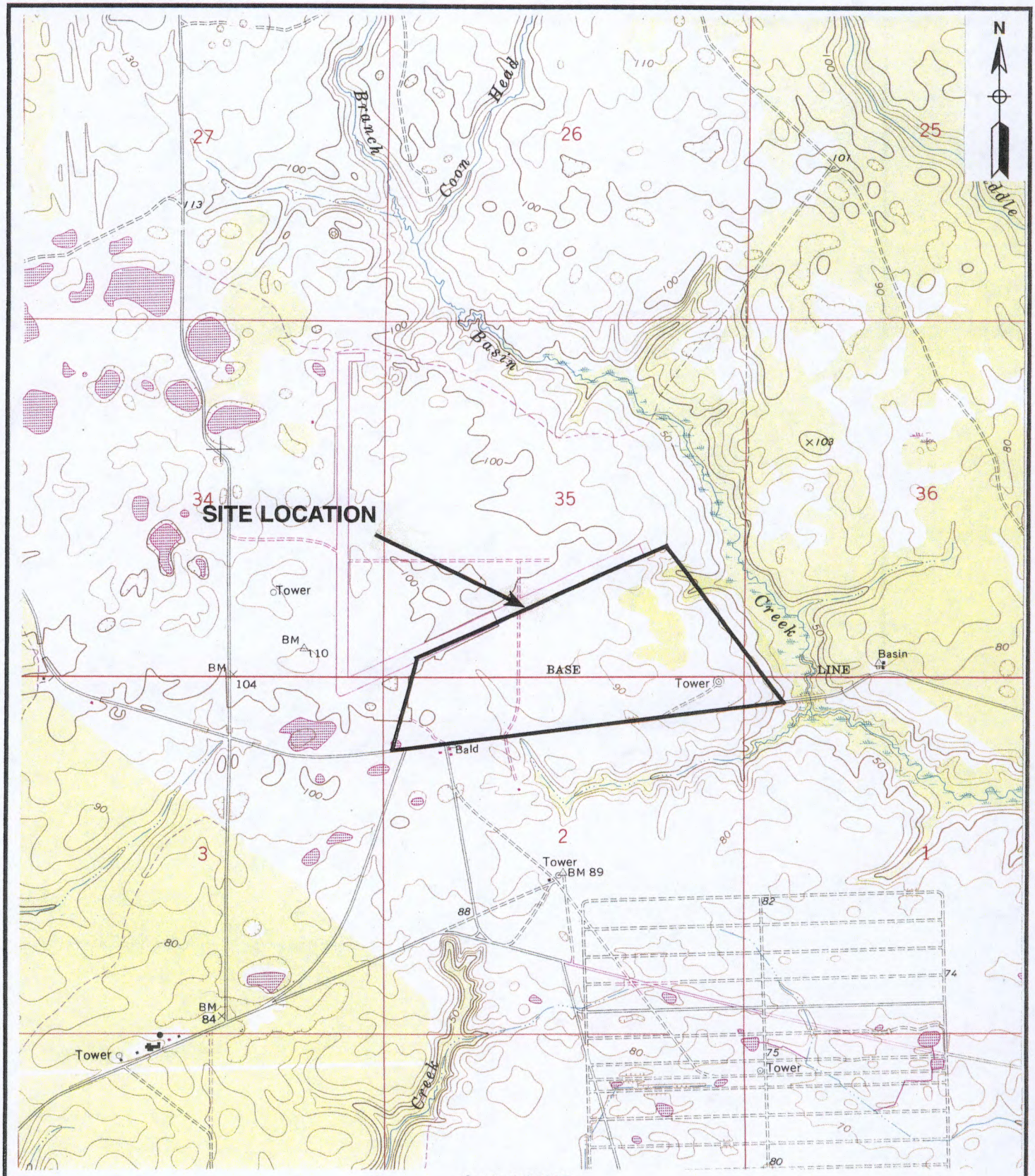
1 Only substances that exceed the Tier I screening levels for either medium are listed here.
2 Basewide background data as established within the *Guidelines for COPC Identification at Eglin AFB*. No appropriate site-specific background locations were identified.
3 NA = Indicates analytical suite was not analyzed for the specified medium.
4 NE = Indicates these compounds do not exceed the applicable Tier I screening levels in this medium.



RUST ENVIRONMENT & INFRASTRUCTURE

Figure 1.1
IDENTIFICATION OF COPCs
Eglin & Hurlburt AFB
Excerpted from FDEP Letter, May 26, 1995


Santa Rosa County
Okaloosa County
Walton County
Crestview, FL
N
Yellow River
US I-10
US I-10
Yellow River
HWY. 85
HWY. 285
Blackwater Bay
HWY. 87
AOC NO. 24
HWY. 20
Freeport, FL
East Bay
Choctawhatchee Bay
Ft. Walton Beach
HWY. 98
Destin
Santa Rosa Sound
Gulf Of Mexico
LEGEND
Eglin AFB Reservation Boundary
Roads
Approximate Scale (miles)
0 2 4 6
RUST ENVIRONMENT & INFRASTRUCTURE
FIGURE 2.1
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
SITE LOCATION MAP
EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000
SI-FSP/Date: 12-8-94/Rev. 0



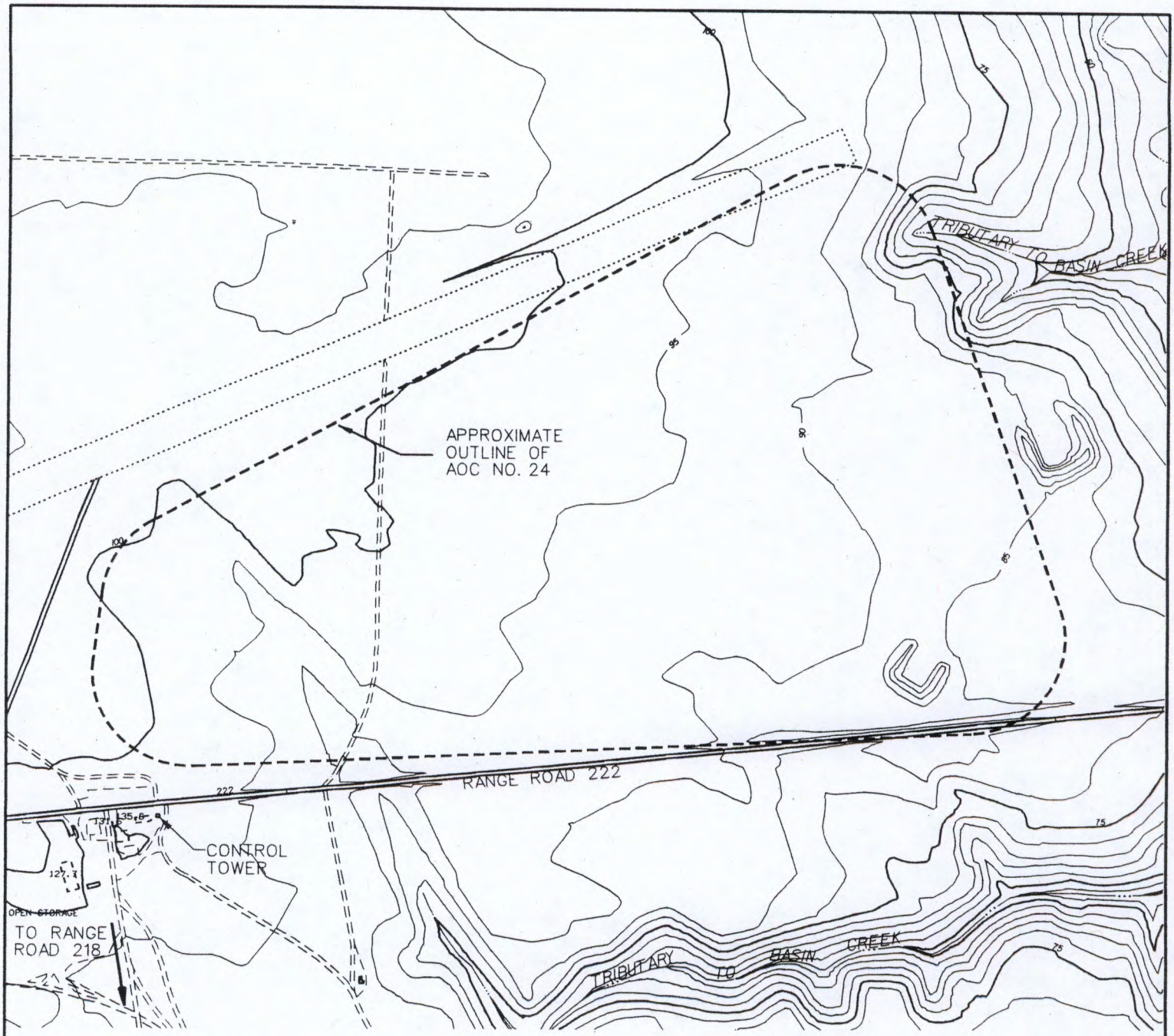
Ref.: U.S.G.S., 7.5 min Quadrangle
Niceville SE, FL. 1970, PR 1987.

RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 2.2
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
SITE AND VICINITY MAP

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

SI-FSP/Date: 12-8-94/Rev. 0



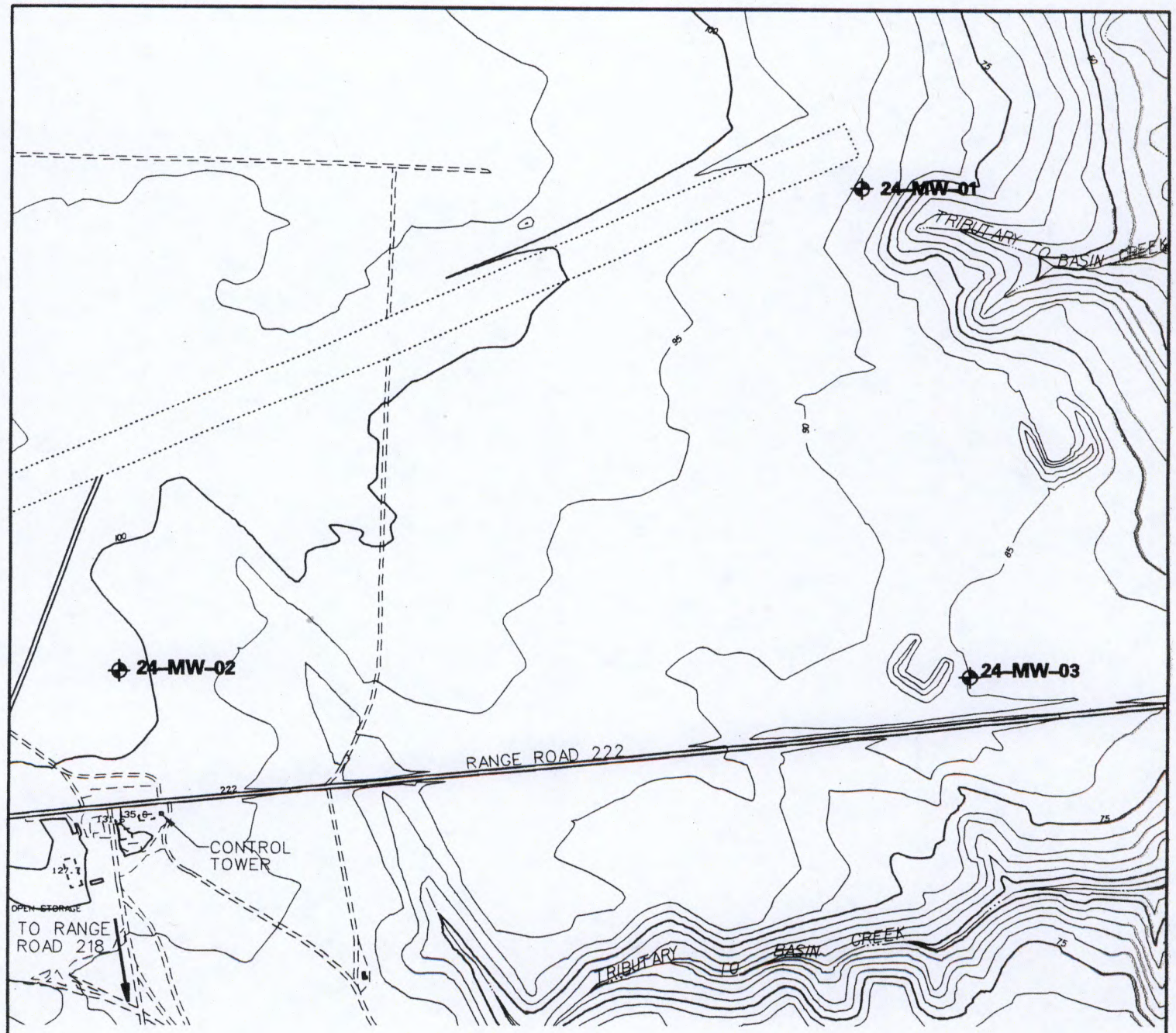
BASE MAP PRODUCED FROM BASE COMPREHENSIVE PLAN MAPPING, US ARMY ENGINEERING DISTRICT, MOBILE, AERIAL PHOTO DATES: DECEMBER 25 & 26, 1993. ADDITIONAL DATA BY GUSTIN, COTHERN & TUCKER, INC., SURVEY DATE: SEPTEMBER 1995. CONTOUR INTERVAL = 5 FEET.

RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 2.3
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
SITE LAYOUT MAP

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

N:\55551\5551A-24.DGN



NORTH

0 300 600 900
SCALE IN FEET

LEGEND

MONITORING WELL

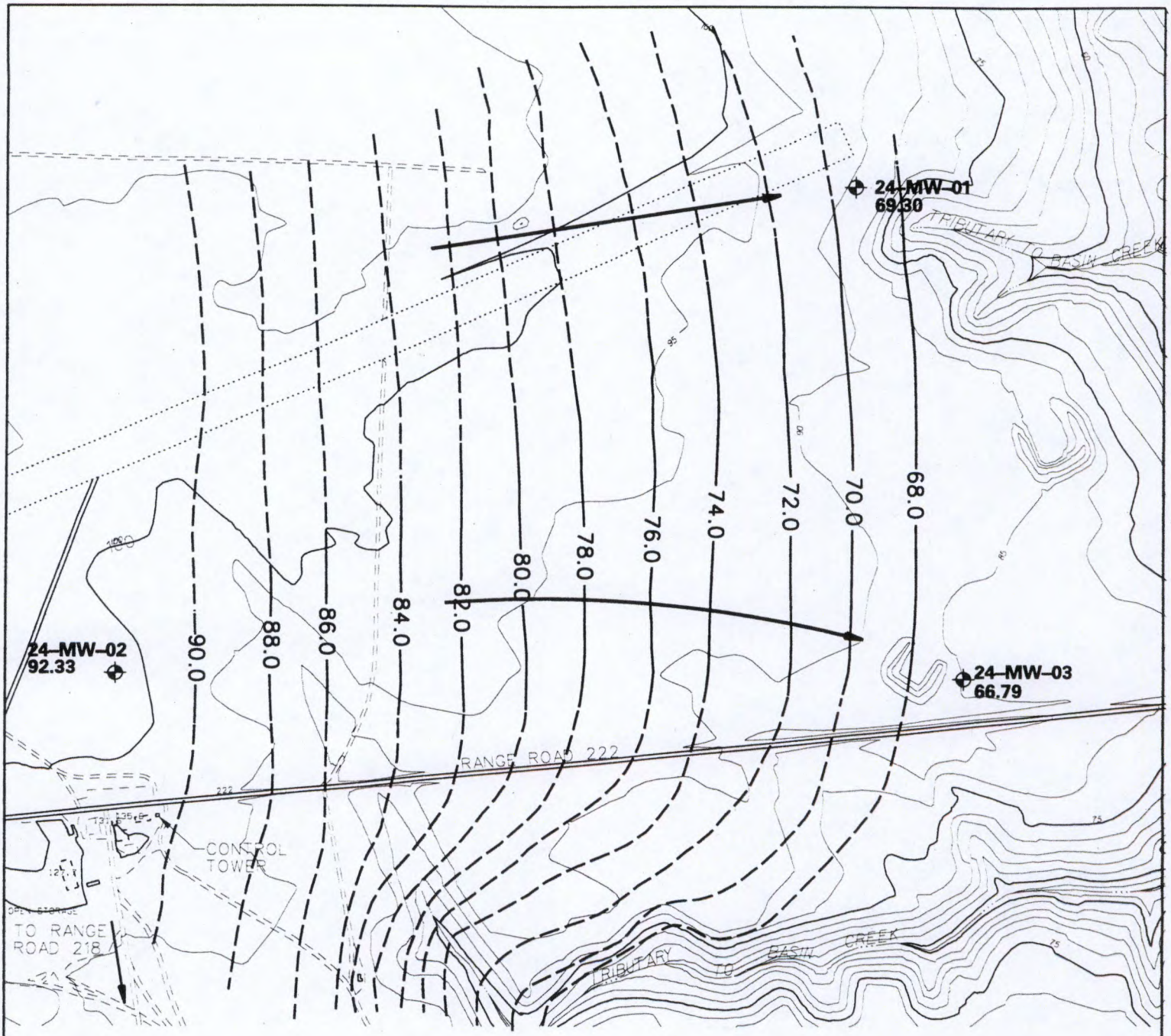
BASE MAP PRODUCED FROM BASE COMPREHENSIVE PLAN MAPPING, US ARMY ENGINEERING DISTRICT, MOBILE, AERIAL PHOTO DATES: DECEMBER 25 & 26, 1993. ADDITIONAL DATA BY GUSTIN, COTHERN & TUCKER, INC., SURVEY DATE: SEPTEMBER 1995. CONTOUR INTERVAL - 5 FEET.

RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 3.1
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
GROUNDWATER SAMPLING LOCATIONS

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

N:\55551\5551G-24.DGN



LEGEND

- MONITORING WELL
- **92.33** WATER TABLE ELEVATION FT NGVD (11/14/95)
- **-90.0-** WATER TABLE CONTOUR FT NGVD (11/14/95) CONTOUR INTERVAL 2 FEET
- ESTIMATED FLOW DIRECTION

NORTH

0 300 600 900

SCALE IN FEET

BASE MAP PRODUCED FROM BASE COMPREHENSIVE PLAN MAPPING, US. ARMY ENGINEERING DISTRICT, MOBILE, AERIAL PHOTO DATES: DECEMBER 25 & 26, 1993. ADDITIONAL DATA BY GUSTIN, COTHERN & TUCKER, INC., SURVEY DATE: SEPTEMBER 1995. CONTOUR INTERVAL = 5 FEET.

RUST ENVIRONMENT & INFRASTRUCTURE

FIGURE 4.1
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
WATER TABLE CONTOUR MAP

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

N:\55551\5551W-24.DGN

APPENDIX A
BORING (HTW) LOGS

HTW DRILLING LOG

HOLE NO. 24-MW-01

1. COMPANY NAME: Rust Environment & Infrastructure	2. DRILLING CONTRACTOR: AE Drilling	SHEET 1 OF 5 SHEETS
3. PROJECT: Eglin AFB Site Investigation	4. LOCATION: AOC 24 C-52A Aerial Overspray Site	
5. NAME OF DRILLER: Gene Barnes	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II	
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT: 6.25-inch I.D. HSA; 2.0-inch O.D. Split Spoon	8. HOLE LOCATION: Northeast Part of Site	
	9. SURFACE ELEVATION: 88.1 ft. MSL	
	10. DATE STARTED: 6/19/95	11. DATE COMPLETED: 6/20/95
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: 19.90 ft. bls	
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 19.39 ft. bls / 14 hours	
14. TOTAL DEPTH OF HOLE: 33.0 ft. bls	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	9	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
None	N/A	N/A	N/A	N/A	N/A	N/A

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
X		X		Michael J. Dora

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
88.10	0	**POORLY GRADED SAND (SP)** Very loose, dry, reddish yellow (7.5 YR 6/8), mostly fine sand, trace silt and clay; no rootlets.	No instrument response	S-02	N/A	1 1 2 2	90% recovery
87.10	1						
86.10	2						75% recovery
85.10	3		No instrument response	S-04	N/A	2 2 3 3	
84.10	4	**POORLY GRADED SAND (SP)** Loose, dry, yellow (10 YR 7/6), mostly fine sand, trace silt and clay.	No instrument response	S-06	N/A	2 2	60% recovery
83.10	5						

HTW DRILLING LOG

HOLE NO. 24-MW-01

PROJECT: Eglin AFB Site Investigation
AOC 24 C-52A Aerial Overspray Site

INSPECTOR: Mike Doran

SHEET 2 OF 5 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
			No instrument response	S-06 (Cont.)	N/A	3 4	
82.10	6	**POORLY GRADED SAND (SP)** Loose, dry, yellow (10 YR 7/6), mostly fine sand, trace silt and clay.	No instrument response	S-08	N/A	2 3 3 4	75% recovery
81.10	7						
80.10	8	**POORLY GRADED SAND (SP)** Loose, dry, yellowish red (5 YR 5/8), mostly fine sand, trace silt and clay; quartz sand.	No instrument response	S-10	N/A	4 6 9 10	90% recovery
79.10	9	**POORLY GRADED SAND (SP)** Medium dense, dry, yellow (10 YR 7/6), mostly fine sand, trace clay; quartz sand.					
78.10	10						
77.10	11						
76.10	12						
75.10	13	**POORLY GRADED SAND (SP)** Dense, dry, yellow (10 YR 7/6), mostly fine sand, trace silt and clay; quartz sand.	No instrument response	S-15	N/A	9	75% recovery

HTW DRILLING LOG

HOLE NO. 24-MW-01

PROJECT: Eglin AFB Site Investigation
AOC 24 C-52A Aerial Overspray Site

INSPECTOR: Mike Doran

SHEET 3 OF 5 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
74.10	14	**POORLY GRADED SAND (SP)** Dense, dry, very pale brown (10 YR 8/3), mostly fine sand, trace silt and clay; quartz sand.	No instrument response	S-15 (Cont.)	N/A	13 19 22	
73.10	15						
72.10	16						
71.10	17						
70.10	18	**POORLY GRADED SAND (SP)** Medium dense, dry, pale yellow (2.5 Y 8/4), mostly fine sand, trace silt and clay; quartz sand, silt/clay content decreasing with depth.				2 4	90% recovery
69.10	19		No instrument response	S-20	N/A	7	Groundwater encountered at 19.9 ft. BLS.
68.10	20					9	
67.10	21						
66.10	22						

HTW DRILLING LOG

HOLE NO. 24-MW-01

PROJECT: Eglin AFB Site Investigation
AOC 24 C-52A Aerial Overspray Site

INSPECTOR: Mike Doran

SHEET 4 OF 5 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
65.10	23	**POORLY GRADED SAND (SP)** Loose, wet, pale yellow (2.5 YR 8/2), mostly fine sand, trace clay; clear quartz sand, clay decreasing with depth.					
						3	80% recovery
						4	
64.10	24		No instrument response	S-25	N/A		
						5	
						6	
63.10	25						
62.10	26						
61.10	27						
60.10	28	**CLAYEY SAND (SC)** Very loose, wet, pale yellow (2.5 Y 8/2), mostly sand, little clay; quartz sand with clay content increasing with depth.					
						1	65% recovery
						1	
59.10	29		No instrument response	S-30	N/A		
						1	
						2	
58.10	30						
57.10	31						

HTWNEW
6.25 in. I.D. HSA
12/6/95 09:17

PROJECT: Eglin AFB Site Investigation
DACW45-94-D-0002

HOLE NO. 24-MW-01

HTW DRILLING LOG

HOLE NO. 24-MW-01

PROJECT: Eglin AFB Site Investigation
AOC 24 C-52A Aerial Overspray Site

INSPECTOR: Mike Doran

SHEET 5 OF 5 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
56.10	32						
55.10	33	**Bottom of Exploration at 33.0 ft.** Note: Installed 2.0 in. Sch. 40 PVC monitoring well. Screened interval from 18.47 to 27.68 ft. below land surface. Used water from spigot at field office to tremie sand. Approximately 35 gallons used.					
54.10	34						
53.10	35						
52.10	36						
51.10	37						
50.10	38						
49.10	39						
48.10	40						

HTW DRILLING LOG

HOLE NO. 24-MW-02

1. COMPANY NAME: Rust Environment & Infrastructure	2. DRILLING CONTRACTOR: AE Drilling
SHEET 1 OF 3 SHEETS	
3. PROJECT: Eglin AFB Site Investigation	4. LOCATION: AOC No. 24 C-52A Aerial Overspray Site
5. NAME OF DRILLER: Gene Barnes	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT: 6.25-inch I.D. HSA; 2.0-inch O.D. Split Spoon	8. HOLE LOCATION: Northeastern part of site
	9. SURFACE ELEVATION: 101.2 ft. MSL
	10. DATE STARTED: 6/22/95 — 11. DATE COMPLETED: 6/22/95
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.72 ft. / 1 Hour
14. TOTAL DEPTH OF HOLE: 20.0 ft. bls	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	4	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
None	N/A	N/A	N/A	N/A	N/A	N/A

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
X		X		Michael D. Dora

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
101.20	0						
100.20	1						
99.20	2						
98.20	3	**POORLY GRADED SAND (SP)** Very loose, dry, reddish yellow (7.5 YR 6/8), mostly fine sand, trace clay, trace heavies, quartz sand.				1	75% Recovery
97.20	4		No instrument response	S-05	N/A	1 2 4	
96.20	5						

HTW DRILLING LOG

HOLE NO. 24-MW-02

PROJECT: Eglin AFB Site Investigation
AOC No. 24 C-52A Aerial Overspray Site

INSPECTOR: Michael J. Doran

SHEET 2 OF 3 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
95.20	6						
94.20	7						
93.20	8	**POORLY GRADED SAND (SP)** Loose, dry, very pale brown (10 YR 7/4), mostly fine sand, trace clay and black fine grained minerals; clean quartz sand.				2	80% Recovery
92.20	9		No instrument response	S-10	N/A	4 6 7	Groundwater encountered at approximately 9.5 ft.
91.20	10						
90.20	11						
89.20	12						
88.20	13	**POORLY GRADED SAND (SP)** Loose, wet, brown (7.5 YR 4/4), mostly fine sand, trace clay; color tends to darken with depth, clean quartz sand.	No instrument response	S-15	N/A	3	75% Recovery

HTW DRILLING LOG

HOLE NO. 24-MW-02

PROJECT: Eglin AFB Site Investigation
AOC No. 24 C-52A Aerial Overspray Site

INSPECTOR: Michael J. Doran

SHEET 3 OF 3 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
87.20	14		No instrument response	S-15 (Cont.)	N/A	4 4 6	
86.20	15						
85.20	16						
84.20	17						
83.20	18	**POORLY GRADED SAND (SP)** Loose, wet, brown (7.5 YR 4/3), mostly fine sand, trace clay; trace black fine grained sand sized minerals.				4 4 5 7	60% Recovery
82.20	19		No instrument response	S-20	N/A		
81.20	20	**Bottom of Exploration at 20.0 ft.** Note: Installed 2.0-inch Sch. 40 PVC monitoring well. Screen interval is 8.00 to 17.80 ft. bls.					
80.20	21	Used water from spigot at Rust field office to tremie filter sand. Approximately 30 gallons used.					
79.20	22						

HTWNEW
100-001-064
12/12/95 10:16

PROJECT: Eglin AFB Site Investigation
DACW45-94-D-0002

HOLE NO. 24-MW-02

HTW DRILLING LOG

HOLE NO. 24-MW-03

1. COMPANY NAME: Rust Environment & Infrastructure	2. DRILLING CONTRACTOR: AE Drilling
SHEET 1 OF 4 SHEETS	
3. PROJECT: Eglin AFB Site Investigation	4. LOCATION: AOC No. 24 C-52A Aerial Overspray Site
5. NAME OF DRILLER: Gene Barnes	6. MANUFACTURER'S DESIGNATION OF DRILL: Acker AD II
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT: 6.25-inch I.D. HSA; 2.0-inch O.D. Split Spoon	8. HOLE LOCATION: Southeastern part of site
	9. SURFACE ELEVATION: 83.9 ft. MSL
	10. DATE STARTED: 6/23/95 — 11. DATE COMPLETED: 6/23/95
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: 17.4 ft. bls
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 17.35 ft. bls / 1 Hr.
14. TOTAL DEPTH OF HOLE: 28.0 bls	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Yes	5	N/A	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
None	N/A	N/A	N/A	N/A	N/A	N/A

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
X		X		Michael J. Doran

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
83.90	0						
82.90	1						
81.90	2						
80.90	3	**POORLY GRADED SAND (SP)** Loose, dry, reddish yellow (7.5 YR 6/8), mostly fine sand, trace clay; one large root(?) at 4 Ft. BLS encountered.	No instrument response	S-05	N/A	2 2 3 4	
79.90	4						
78.90	5						

HTW DRILLING LOG

HOLE NO. 24-MW-03

PROJECT: Eglin AFB Site Investigation
AOC No. 24 C-52A Aerial Overspray Site

INSPECTOR: Michael J. Doran

SHEET 2 OF 4 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
77.90	6						
76.90	7						
75.90	8	**POORLY GRADED SAND (SP)** Loose, dry, reddish yellow (7.5 YR 7/6), mostly fine sand, trace clay; quartz.				3	
74.90	9		No instrument response	S-10	N/A	4	
73.90	10	**POORLY GRADED SAND (SP)** Loose, moist, yellowish red (5 YR 5/8), mostly fine sand, trace clay; quartz.				4 5	
72.90	11						
71.90	12						
70.90	13	**POORLY GRADED SAND (SP)** Medium dense, dry, reddish yellow (7.5 YR 6/8), mostly fine sand, trace clay; scattered heavy minerals; quartz. **POORLY GRADED SAND (SP)**	No instrument response	S-15	N/A	4	

HTW DRILLING LOG

HOLE NO. 24-MW-03

PROJECT: Eglin AFB Site Investigation
AOC No. 24 C-52A Aerial Overspray Site

INSPECTOR: Michael J. Doran

SHEET 4 OF 4 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
60.90	23	**POORLY GRADED SAND (SP)** Medium dense, wet, yellow (10 YR 7/6), mostly fine sand, trace clay; quartz.				5	
59.90	24		No instrument response	S-25	N/A	7	
58.90	25					9	
57.90	26						
56.90	27						
55.90	28	**Bottom of Exploration at 28.0 ft.**					
54.90	29	Note: Installed 2.0-inch Sch. 40 PVC monitoring well. Screen interval is 25.4 to 15.98 ft. bls. Used water from Rust field trailer spigot to tremie filter sand. Approximately 30 gallons used.					
53.90	30						
52.90	31						

HTW DRILLING LOG

HOLE NO. 24-MW-03

PROJECT: Eglin AFB Site Investigation
AOC No. 24 C-52A Aerial Overspray Site

INSPECTOR: Michael J. Doran

SHEET 3 OF 4 SHEETS

Elev. Ft. MSL a	Depth b	Description of Materials c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	Remarks h
69.90	14	Medium dense, dry, very pale brown (10 YR 8/4), mostly clean sand, trace clay; clay decreases with depth.	No instrument response	S-15 (Cont.)	N/A	5 6 9	
68.90	15						
67.90	16						
66.90	17						
65.90	18	**POORLY GRADED SAND (SP)** Medium dense, wet, yellow (10 YR 7/8), mostly fine sand, trace clay; quartz.				5 8 9 11	
64.90	19		0.2	S-20	N/A		
63.90	20						
62.90	21						
61.90	22						

APPENDIX B
MONITORING WELL CONSTRUCTION DETAILS

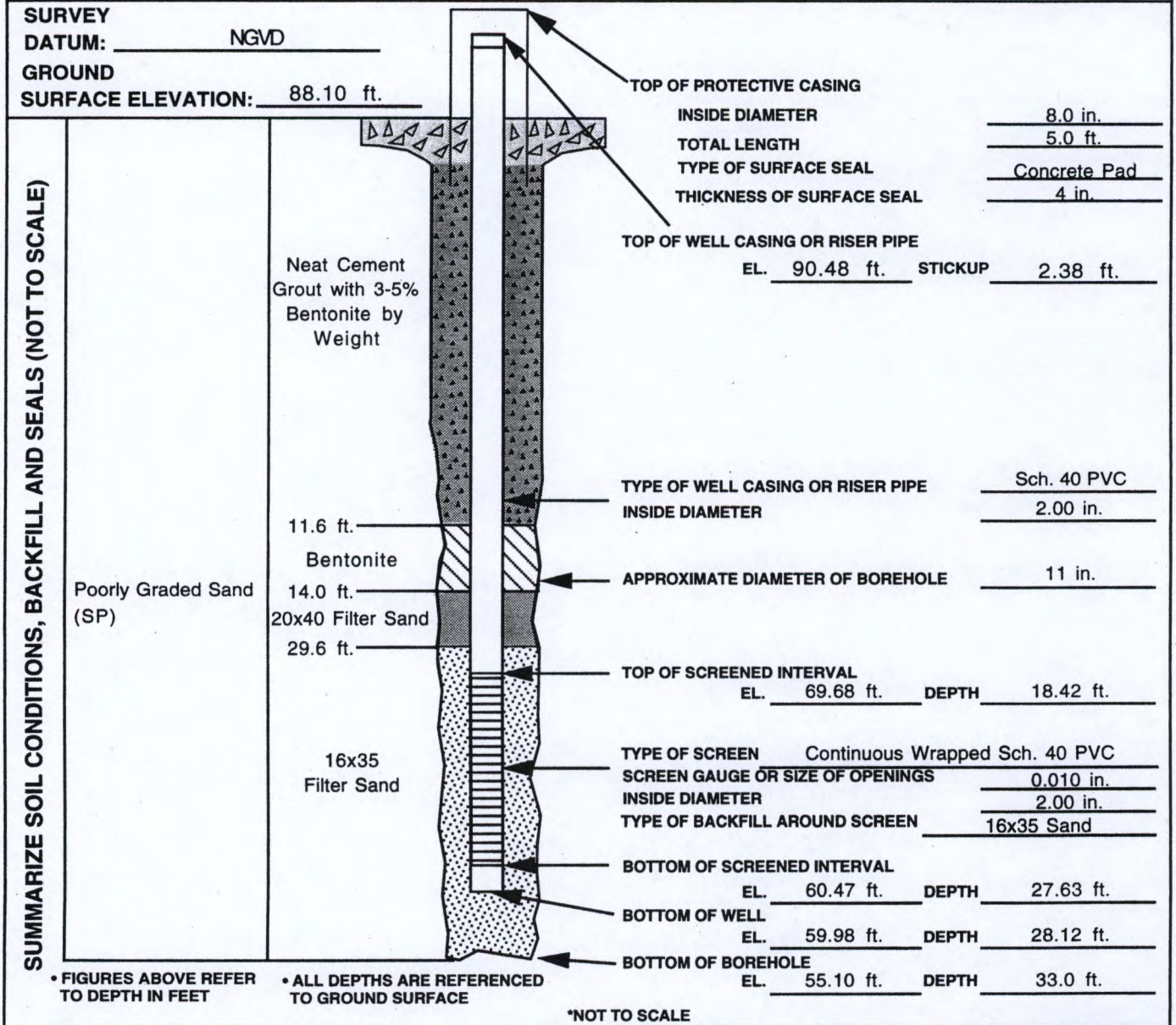
RUST ENVIRONMENT & INFRASTRUCTURE

GROUNDWATER MONITORING WELL INSTALLATION DETAIL

PROJECT: EGLIN AFB SITE INVESTIGATION
LOCATION: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
CLIENT: USACE-OMAHA DISTRICT
CONTRACTOR: AE Drilling
DRILLER: Gene Barnes **CERTIFICATION NO:** 2598
RUST FIELD REPRESENTATIVE: Mike Doran

JOB NO. 55551.000
INSTALLATION NO. 24-MW-01
TYPE OF INSTALLATION Monitoring Well
BORING NO. 24-MW-01
LOCATION Northeast Part of Site
INSTALLATION DATE 06/19/95

SURVEY DATUM: NGVD
GROUND SURFACE ELEVATION: 88.10 ft.



• FIGURES ABOVE REFER TO DEPTH IN FEET
• ALL DEPTHS ARE REFERENCED TO GROUND SURFACE
*NOT TO SCALE

20.80 ft. (LENGTH OF RISER PIPE) + 9.21 ft. (LENGTH OF SCREEN) + 0.49 ft. (LENGTH OF CAP/PLUG) = 30.50 ft. (TOTAL)

GROUT
BENTONITE SEALS
FINE SAND
FILTER PACK
CONCRETE

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RUST ENVIRONMENT & INFRASTRUCTURE

GROUNDWATER MONITORING INSTALLATION DETAIL (Flush Mount)

PROJECT: EGLIN AFB SITE INVESTIGATION
JOB NO. 55551.000

LOCATION: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
INSTALLATION NO. 24-MW-02

CLIENT: USACE-OMAHA DISTRICT
TYPE OF INSTALLATION Monitoring Well

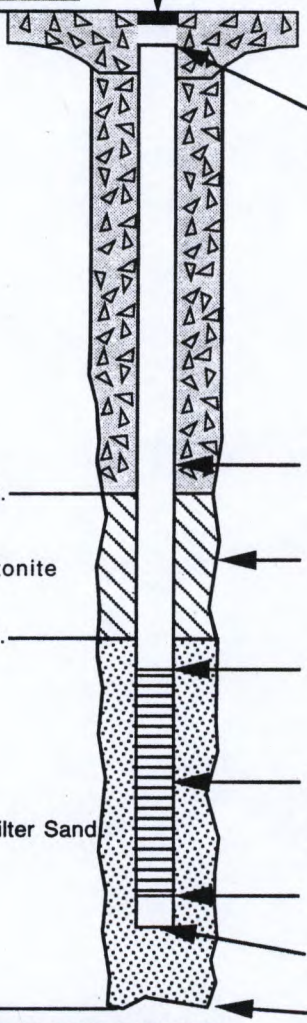
CONTRACTOR: A.E. Drilling
BORING NO. 24-MW-02

DRILLER: Gene Barnes **CERTIFICATION NO:** 2598
LOCATION West Central Part of Site

RUST FIELD REPRESENTATIVE: Michael J. Doran
INSTALLATION DATE 06/22/95

SURVEY DATUM: NGVD

GROUND SURFACE ELEVATION: 101.20 ft.



TOP OF PROTECTIVE VAULT

INSIDE DIAMETER 8.0 in.

TYPE OF SURFACE SEAL Concrete Pad

THICKNESS OF SURFACE SEAL 4 in.

TOP OF WELL CASING OR RISER PIPE
EL. 101.08 ft. **STICKUP** -0.12 ft.

SUMMARIZE SOIL CONDITIONS, BACKFILL AND SEALS (NOT TO SCALE)

Poorly Graded Sand (SP)

1.1 ft.

Bentonite

3.7 ft.

16x35 Filter Sand

TYPE OF WELL CASING OR RISER PIPE Sch. 40 PVC
INSIDE DIAMETER 2.00 in.

APPROXIMATE DIAMETER OF BOREHOLE 10 in.

TOP OF SCREENED INTERVAL
EL. 92.62 ft. **DEPTH** 8.58 ft.

TYPE OF SCREEN Continuous Wrapped Sch. 40 PVC
SCREEN GAUGE OR SIZE OF OPENINGS 0.010 in.
INSIDE DIAMETER 2.00 in.
TYPE OF BACKFILL AROUND SCREEN 16x35 Sand

BOTTOM OF SCREENED INTERVAL
EL. 83.12 ft. **DEPTH** 18.08 ft.

BOTTOM OF WELL
EL. 82.62 ft. **DEPTH** 18.58 ft.

BOTTOM OF BOREHOLE
EL. 81.20 ft. **DEPTH** 20.0 ft.

- FIGURES ABOVE REFER TO DEPTH IN FEET
- ALL DEPTHS ARE REFERENCED TO GROUND SURFACE

*NOT TO SCALE

8.46 ft.	+	9.50 ft.	+	0.50 ft.	=	18.46 ft.
LENGTH OF RISER PIPE		LENGTH OF SCREEN		LENGTH OF CAP/PLUG		TOTAL

GROUT
BENTONITE SEALS
FINE SAND
FILTER PACK
CONCRETE

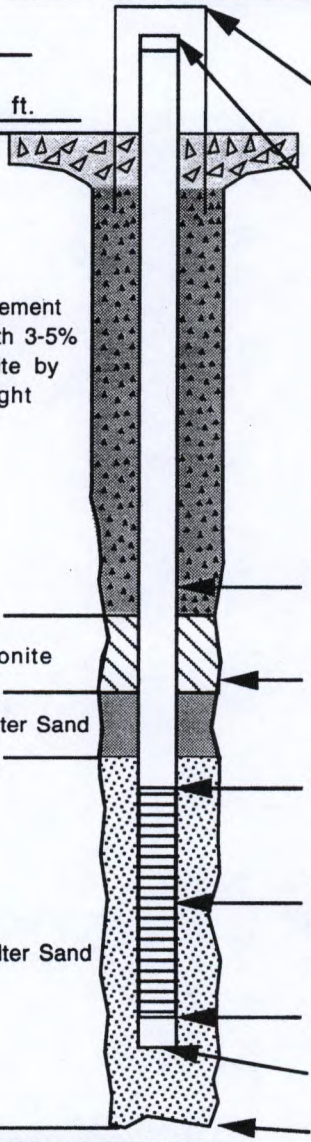
RUST ENVIRONMENT & INFRASTRUCTURE

GROUNDWATER MONITORING WELL INSTALLATION DETAIL

PROJECT: EGLIN AFB SITE INVESTIGATION
LOCATION: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
CLIENT: USACE-OMAHA DISTRICT
CONTRACTOR: A.E. Drilling
DRILLER: Gene Barnes **CERTIFICATION NO:** 2598
RUST FIELD REPRESENTATIVE: Michael J. Doran

JOB NO. 55551 . 000
INSTALLATION NO. 24-MW-03
TYPE OF INSTALLATION Monitoring Well
BORING NO. 24-MW-03
LOCATION Southeast Part of Site
INSTALLATION DATE 06/23/95

SURVEY DATUM: NGVD
GROUND SURFACE ELEVATION: 83.90 ft.



SUMMARIZE SOIL CONDITIONS, BACKFILL AND SEALS (NOT TO SCALE)

Poorly Graded Sand (SP)

TOP OF PROTECTIVE CASING
INSIDE DIAMETER: 8.0 in.
TOTAL LENGTH: 5.0 ft.
TYPE OF SURFACE SEAL: Concrete Pad
THICKNESS OF SURFACE SEAL: 4 in.

TOP OF WELL CASING OR RISER PIPE
EL. 86.64 ft. STICKUP 2.74 ft.

TYPE OF WELL CASING OR RISER PIPE: Sch. 40 PVC
INSIDE DIAMETER: 2.00 in.

APPROXIMATE DIAMETER OF BOREHOLE: 10 in.

TOP OF SCREENED INTERVAL
EL. 67.67 ft. DEPTH 16.23 ft.

TYPE OF SCREEN: Continuous Wrapped Sch. 40 PVC
SCREEN GAUGE OR SIZE OF OPENINGS: 0.010 in.
INSIDE DIAMETER: 2.00 in.
TYPE OF BACKFILL AROUND SCREEN: 16x35 Sand

BOTTOM OF SCREENED INTERVAL
EL. 58.25 ft. DEPTH 25.65 ft.

BOTTOM OF WELL
EL. 57.76 ft. DEPTH 26.14 ft.

BOTTOM OF BOREHOLE
EL. 55.90 ft. DEPTH 28.0 ft.

- FIGURES ABOVE REFER TO DEPTH IN FEET
- ALL DEPTHS ARE REFERENCED TO GROUND SURFACE

*NOT TO SCALE

18.97 ft. (LENGTH OF RISER PIPE) + 9.42 ft. (LENGTH OF SCREEN) + 0.49 ft. (LENGTH OF CAP/PLUG) = 28.88 ft. (TOTAL)

GROUT
BENTONITE SEALS
FINE SAND
FILTER PACK
CONCRETE

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APPENDIX C

MONITORING WELL DEVELOPMENT LOGS

RUST ENVIRONMENT & INFRASTRUCTURE

MONITORING WELL DEVELOPMENT LOG

Date Started (yr/mo/dy) 95/6/23 Date Completed (yr/mo/dy) 95/6/23

Field Personnel JOHN KARAKORN

Project EGLIN AFB SITE INVESTIGATION

Site Name AOC NO. 24 C-52A AERIAL OVERSPRAY SITE

RUST Job # 55551.000

Well ID # 24-MW-01

☐ Upgradient ☒ Downgradient ☐ Sidegradient

Weather Conditions Partly Cloudy, Rain

Air Temperature 85 - 90 °F

Total Well Depth (TWD) = 31.16 1/100 ft
From Top of Well Casing

Depth to Groundwater (DGW) = 22.34 1/100 ft
From Top of Well Casing

Length of Water Column (LWC) = TWD - DGW = 8.82 1/100 ft

1 Casing Volume (OCV) = LWC X 0.16 = 1.41 gallons

5 Casing Volumes = 7.06 gallons

Method of Well Development Stainless Steel Bailer, Grundfos Pump

Total Volume of Water Removed 134 gallons

Date/Time (yr/mo/dy/Military)		Discharge Rate (gpm)	Cumulative Volume Purged (gal)	Water Temp (°C)	pH	Specific Conductivity (µS/cm)	Turbidity/Color (NTU's)	Sand Content (%)	Remarks
95/6/23	1205	0	0	24	8.08	18	1823/ Dark Tan	<5%	Very Cloudy
95/6/23	1258	-	10	24	8.01	72	1784/ Dark Tan	0	Very Cloudy
95/6/23	1312	1.67	40	24	8.31	55	1284/ Tan	0	Cleared up
95/6/23	1330	1.67	70	24	8.39	31	102/ Clearer, Milky	0	Cleared up, surged, moved pump
95/6/23	1348	1.67	100	24	7.38	27	262/ Milky	0	Got cloudy due to surge
95/6/23	1406	1.67	130	24	8.31	37	19/ Clear	0	Clear
95/6/23	1408	1.67	132	24	8.20	29	18/ Clear	0	Clear
95/6/23	1411	1.67	134	24	8.36	31	19/ Clear	0	Clear

COMMENTS/ OBSERVATIONS Sheen observed during initial bailing; no odor; water cleared up quickly after surge.

RUST ENVIRONMENT & INFRASTRUCTURE

MONITORING WELL DEVELOPMENT LOG

Date Started (yr/mo/dy) 95/6/23 Date Completed (yr/mo/dy) 95/6/23

Field Personnel JOHN KARAKORN

Project EGLIN AFB SITE INVESTIGATION

Site Name AOC NO. 24 C-52A AERIAL OVERSPRAY SITE

RUST Job # 55551.000

Well ID # 24-MW-02

☒ Upgradient ☐ Downgradient ☐ Sidegradient

Weather Conditions Cloudy, Rain, Light wind

Air Temperature 85 - 90 °F

Total Well Depth (TWD) = From Top of Well Casing 18.08 1/100 ft

Depth to Groundwater (DGW) = From Top of Well Casing 10.00 1/100 ft

Length of Water Column (LWC) = TWD - DGW = 8.08 1/100 ft

1 Casing Volume (OCV) = LWC X 0.16 = 1.29 gallons

5 Casing Volumes = 6.46 gallons

Method of Well Development Stainless Steel Bailer, Grundfos Pump

Total Volume of Water Removed 200 gallons

Date/Time (yr/mo/dy/Military)		Discharge Rate (gpm)	Cumulative Volume Purged (gal)	Water Temp (°C)	pH	Specific Conductivity (µS/cm)	Turbidity/Color (NTU's)	Sand Content (%)	Remarks
95/6/23	1520	0	0	24	7.13	51	540/ Dark Brown	Few Sand,< 5%	Very Cloudy
95/6/23	1550	-	10	25	7.53	95	540/ Dark Brown	0	Very Cloudy
95/6/23	1605	2	40	24	7.84	70	540/ Brown	0	Very Cloudy
95/6/23	1620	2	70	25	7.86	115	540/ Light Brown	0	Cleared-up Slightly, Cloudy
95/6/23	1635	2	100	25	8.02	110	217/ Faint Brown	0	Less Cloudy
95/6/23	1650	2	130	25	8.13	94	144/ Light Tan	0	Less Cloudy
95/6/23	1705	2	160	24	8.04	87	94/ Off White	0	Almost Clear
95/6/23	1715	2	190	24	8.08	76	87/ Off white	0	Almost Clear
95/6/23	1720	2	200	24	8.10	78	84/ Off white	0	Almost Clear

COMMENTS/ OBSERVATIONS Discharge water cleared up very slowly.

RUST ENVIRONMENT & INFRASTRUCTURE

MONITORING WELL DEVELOPMENT LOG

Date Started (yr/mo/dy) 95/6/26 Date Completed (yr/mo/dy) 95/6/26

Field Personnel JOHN KARAKORN

Project EGLIN AFB SITE INVESTIGATION

Site Name AOC NO. 24 C-52A AERIAL OVERSPRAY SITE

RUST Job # 55551.000

Well ID # 24-MW-03

☐ Upgradient ☒ Downgradient ☐ Sidegradient

Weather Conditions Partly Sunny, Light Wind

Air Temperature 90-95 °F

Total Well Depth (TWD) = From Top of Well Casing 28.98 1/100 ft

Depth to Groundwater (DGW) = From Top of Well Casing 20.36 1/100 ft

Length of Water Column (LWC) = TWD - DGW = 8.62 1/100 ft

1 Casing Volume (OCV) = LWC X 0.16 = 1.38 gallons

5 Casing Volumes = 6.90 gallons

Method of Well Development Stainless Steel Bailer, Grundfos Pump

Total Volume of Water Removed 222 gallons

Date/Time (yr/mo/dy/Military)		Discharge Rate (gpm)	Cumulative Volume Purged (gal)	Water Temp (°C)	pH	Specific Conductivity (µS/cm)	Turbidity/Color (NTU's)	Sand Content (%)	Remarks
95/6/26	0905	0	0	25	7.49	43	1339/ Tan, Orange	Trace, <5%	Very Cloudy
95/6/26	0942	-	10	25	7.68	63	942/ Tan	0	Very Cloudy
95/6/26	0957	2	40	24	7.63	21	211/ Light Milky	0	Almost Clear
95/6/26	1011	2	70	25	7.78	36	26/ No Color	0	Clear, Displaced Pump, Surged
95/6/26	1026	2	100	24	7.69	32	7/ No Color	0	Clear, Displaced Pump, Surged
95/6/26	1041	2	130	24	7.64	35	10/ No Color	0	Clear, Displaced Pump, Surged
95/6/26	1056	2	160	24	7.70	45	387/ Milky	0	Got cloudy due to surge
95/6/26	1111	2	190	24	7.66	44	8/ No Color	0	Clear
95/6/26	1126	2	220	24	7.59	47	7/ No Color	0	Clear
95/6/26	1127	2	222	24	7.62	45	7/ No Color	0	Clear

COMMENTS/ OBSERVATIONS Discharge water cleared up very quickly after surge and pump displacement.

APPENDIX D
HEADSPACE SCREENING LOGS

RUST ENVIRONMENT & INFRASTRUCTURE

HEADSPACE ANALYSES LOG

PROJECT:	EGLIN AFB SITE INVESTIGATION	**JOB NUMBER:**	55551.000
CLIENT:	USACE-OMAHA DISTRICT	**DATE SAMPLED:**	6/19/95
LOCATION:	AOC NO. 24 C-52A AREAL OVERSPRAY SITE	**DATE ANALYZED:**	6/19/95
		ANALYST:	M. J. Doran
INSTRUMENT USED:	OVA-128		
EXPLORATION:	24-MW-01		

SAMPLE NUMBER	SAMPLE DEPTH (FT)	SAMPLE TYPE	BACKGROUND READING (PPM)[1]	SAMPLE READING (PPM)[1]		AMBIENT AIR TEMP. (°F)	REMARKS
				WITHOUT CARBON FILTER	WITH CARBON FILTER		
S-02	0 - 2	Soil	NIR	NIR	NIR	90	
S-04	2 - 4	Soil	NIR	NIR	NIR	90	
S-06	4 - 6	Soil	NIR	NIR	NIR	90	
S-8	6 - 8	Soil	NIR	NIR	NIR	90	
S-10	8 - 10	Soil	NIR	NIR	NIR	90	
S-15	13 - 15.	Soil	NIR	NIR	NIR	90	
S-20	18 - 20	Soil	NIR	NIR	NIR	90	
S-25	23 - 25	Soil	NIR	NIR	NIR	90	
S-35	33 - 35	Soil	NIR	NIR	NIR	90	

NOTES: [1] PPM represents concentration of detectable volatile and gaseous compounds in parts per million of air.
NA = Not Applicable
NMT = No Measurement Taken
NIR = No Instrument Response

RUST ENVIRONMENT & INFRASTRUCTURE

HEADSPACE ANALYSES LOG

PROJECT: EGLIN AFB SITE INVESTIGATION
CLIENT: USACE - OMAHA DISTRICT
LOCATION: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
INSTRUMENT USED: OVA-128
EXPLORATION: 24-MW-02

JOB NUMBER: 55551.000
DATE SAMPLED: 6/22/95
DATE ANALYZED: 6/22/95
ANALYST: M. J. Doran

SAMPLE NUMBER	SAMPLE DEPTH (FT)	SAMPLE TYPE	BACKGROUND READING (PPM)[1]	SAMPLE READING (PPM)[1]		AMBIENT AIR TEMP. (°F)	REMARKS
				WITHOUT CARBON FILTER	WITH CARBON FILTER		
S-05	3 - 5	Soil	NIR	NIR	NIR	85	
S-10	8 - 10	Soil	NIR	NIR	NIR	85	
S-15	13 - 15	Soil	NIR	NIR	NIR	85	
S-20	18 - 20	Soil	3.4	NIR	NIR	85	

NOTES: [1] PPM represents concentration of detectable volatile and gaseous compounds in parts per million of air.
NA = Not Applicable
NMT = No Measurement Taken
NIR = No Instrument Response

RUST ENVIRONMENT & INFRASTRUCTURE

HEADSPACE ANALYSES LOG

PROJECT:	EGLIN AFB SITE INVESTIGATION	**JOB NUMBER:**	55551.000
CLIENT:	USACE - OMAHA DISTRICT	**DATE SAMPLED:**	6/23/95
LOCATION:	AOC NO. 24 C-52A AERIAL OVERSPRAY SITE	**DATE ANALYZED:**	6/23/95
		ANALYST:	M. J. Doran
INSTRUMENT USED:	OVA-128		
EXPLORATION:	24-MW-03		

SAMPLE NUMBER	SAMPLE DEPTH (FT)	SAMPLE TYPE	BACKGROUND READING (PPM)[1]	SAMPLE READING (PPM)[1]		AMBIENT AIR TEMP. (°F)	REMARKS
				WITHOUT CARBON FILTER	WITH CARBON FILTER		
S-05	3 - 5	Soil	NIR	NIR	NIR	80	
S-10	8 - 10	Soil	NIR	NIR	NIR	80	
S-15	13 - 15	Soil	NIR	NIR	NIR	80	
S-20	18 - 20	Soil	NIR	0.2	NIR	80	
S-25	23 - 25	Soil	NIR	NIR	NIR	80	

NOTES: [1] PPM represents concentration of detectable volatile and gaseous compounds in parts per million of air.
NA = Not Applicable
NMT = No Measurement Taken
NIR = No Instrument Response

APPENDIX E
SURVEY DATA

GUSTIN, COTHERN & TUCKER, INC.

Land Surveyors/Engineers

121 Hart Street ● Niceville, Florida 32578 ● Telephone (904) 678-5141

AOC No. 24 C-52A AERIAL OVERSPRAY SITE

Note: Latitude Longitude is NAD 83 Geographic Coordinates. Horizontal Datum is North American Datum (NAD) 1983, U. S. Survey Ft. Vertical Datum is National Geodetic Vertical Datum (NGVD) 1929.

DESCRIPTION WELLS	LATITUDE	LONGITUDE	NORTH	EAST	(MP) ELEV.	(GRND.) ELEV.
24-MW-01	30°32'13.3235"	086°18'47.7649"	563522.652	1397657.617	90.48	88.1
24-MW-02	30°31'52.7133"	086°19'22.3570"	561488.919	1394599.564	101.08	101.2
24-MW-03	30°31'53.0586"	086°18'42.2498"	561467.890	1398107.337	86.64	83.9

CERTIFICATION:

I hereby certify that the positions listed above meet or exceed Third-order, class I (1:10,000) horizontal accuracy and Third-order Vertical accuracy.

October 11, 1995 Horace Wayne Walker Jr.

Horace Wayne Walker Jr.
PLS No. 5029

RUST ENVIRONMENT & INFRASTRUCTURE

APPENDIX F
LABORATORY ANALYTICAL DATA
AND
DATA VALIDATION REPORTS

MEMORANDUM

Date: October 24, 1995

To: Rust Environment & Infrastructure

From: EARTH TECH

Subject: Data Validation (4 samples)
Delivery Order Number 5555-02 Support for Eglin AFB, Florida
Chain-of-Custody Number: 189
Area of Concern Number: 24

Overview

Three groundwater samples and one aqueous trip blank were received by Quanterra Incorporated on August 30, 1995. One of the groundwater samples was analyzed for Target Compound List (TCL) volatiles, semivolatiles, and pesticides/polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), herbicides, picloram, malathion, and arsenic. The other groundwater samples were analyzed for herbicides, malathion, and arsenic. The aqueous trip blank was analyzed for TCL volatiles. All analyses were performed using "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Third Edition, September, 1986 (SW-846) and subsequent revisions. Data validation was performed in accordance with the February 1994 "National Functional Guidelines for Evaluating Inorganic Data Review" and February 1994 "National Functional Guidelines for Evaluating Organic Data Review."

Summary

The samples were preserved, where applicable, and received by the laboratory in good condition.

All available data, including blank and matrix spike results, surrogate recoveries, laboratory control sample recoveries, initial and continuing calibration data, and internal standards were reviewed.

Areas of concern with respect to data quality and usability are discussed below according to analytical fraction.

Volatile Organics

Holding Times: All holding time requirements were met.

Laboratory Blanks: No target compounds were detected in the method blanks.

Laboratory Control Sample (LCS): Percent recoveries were within acceptable control limits for all target compounds, with the exception of a high recovery for chloromethane. No action was taken on this basis.

Surrogates: Percent recoveries were within acceptable control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): Batch matrix spike analyses for volatiles were run on samples not included on this COC.

Initial Calibration: The Relative Response Factor (RRF) for 2-butanone was less than 0.05. Non-detects were qualified R. The percent relative standard deviations (%RSDs) were less than 30% for all target compounds.

The internal standard areas for the Level 2 standard were all below 50%. Since the initial calibration met linearity criteria when all standards were considered, the reported non-detects were qualified UJ to indicate imprecise quantitation at low levels.

Continuing Calibration: The RRF was less than 0.05 for 2-butanone. Non-detects have already been qualified R. The percent differences (%Ds) between the initial and continuing calibrations were greater than 25% for a number of compounds. Reported non-detects have already been qualified UJ.

Internal Standards: The retention times and area counts for the internal standards in the samples and associated quality control samples were within control limits, with the exception of the standard discussed above.

Semivolatile Organics (TCL, PAHs, PCP)

Holding Times: All holding time requirements were met.

Laboratory Blanks: No target compounds were detected in the laboratory extraction blanks.

Laboratory Control Sample (LCS): Percent recoveries were within acceptable control limits for all target compounds.

Surrogates: Percent recoveries were within acceptable control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): Matrix spike analyses run on 24-MW-02 were not reported since it was not requested on the COC.

Initial Calibration: The RRFs were greater than 0.05, and the %RSDs were less than 30% for all target compounds.

Four of the six internal standard areas for the Level 5 standard were above 100%. Since the initial calibration met linearity criteria when all standards were considered, the reported results and non-detects were qualified J and UJ, respectively, to indicate imprecise quantitation at low levels.

Continuing Calibration: The RRFs were greater than 0.05, and the %Ds were less than 25% for all target compounds.

Internal Standards: The retention times and area counts for the internal standards in the samples and associated quality control samples were within control limits, with the exception of the standard discussed above.

Pesticides/PCBs, Herbicides, Picloram, and Malathion

Holding Times: All holding time requirements were met.

Laboratory Blanks: No target compounds were detected in the pesticide method blanks associated with the samples. Although dalapon was reported as ND in the herbicide method blank (with a reporting limit of 2.0 μg/L), the quantitation reports showed that the level of dalapon in the blank was essentially the same as those reported in the samples (2.0 vs. a maximum of 2.2). The reported result in 24-MW-02 has been changed to the reporting limit and qualified U. The reported result in 24-MW-03 was qualified U.

Laboratory Control Sample (LCS): Percent recoveries were within acceptable control limits for all target compounds, with the exception of an extremely low recovery of dinoseb. The reported non-detects were qualified R. The %D for quantitation of endosulfan sulfate on two columns was 103. No action was taken on this basis.

Surrogates: Percent recoveries were within acceptable control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): Matrix spike analyses for pesticides/ PCBs run on 24-MW-02 were reported even though it had not been requested on the COC. Recoveries were high for endosulfan sulfate and hexachlorobenzene. No action was taken on this basis.

Initial Calibration: All requirements were met.

Calibration Verification: All requirements were met.

Arsenic

Holding Times: All holding time requirements were met.

Laboratory Blanks: Arsenic was detected in the preparation blank. All reported results for arsenic at concentrations less than five times the level found in the blank were qualified U.

Laboratory Control Sample (LCS): The percent recovery was within acceptable control limits.

ICP Serial Dilution: All requirements were met.

Matrix Spike: Batch matrix spike analyses for arsenic were run on samples not included on this COC.

Calibration Verification: All requirements were met.

Conclusion:

In conclusion, the validated data may be considered useable within the constraints of the assigned qualifiers, with the exception of the non-detects qualified R. These compounds may or may not be present in the samples.

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FULLLOCID	LODATE	LABLOTCTL	CASNUM	COMPNAME	EXMCODE	ANMCODE	PARVAL		UNITMEAS	ET QUALIFIER
24-MW-01	08/29/95	5243097	7440-38-2	Arsenic	SW3005	SW6010	= 0.010		MG/L	U
24-MW-01	08/29/95	5248039	88-85-7	Dinoseb	METHOD	SW8151	ND	0.0	UG/L	R
24-MW-02	08/29/95	5243097	7440-38-2	Arsenic	SW3005	SW6010	= 0.010		MG/L	U
24-MW-02	08/29/95	5248039	75-99-0	Dalapon	METHOD	SW8151	= 2.0		UG/L	U
24-MW-02	08/29/95	5248039	88-85-7	Dinoseb	METHOD	SW8151	ND	0.0	UG/L	R
24-MW-02	08/29/95	5244063	540-59-0	" 1,2-Dichloroethene, total"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	71-55-6	"1,1,1-Trichloroethane "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	79-34-5	"1,1,2,2-Tetrachloroethane "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	79-00-5	"1,1,2-Trichloroethane"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-34-3	"1,1-Dichloroethane"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-35-4	"1,1-Dichloroethene "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	107-06-2	"1,2-Dichloroethane"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	78-87-5	"1,2-Dichloropropane "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	10061-01-5	"cis-1,3-Dichloropropene "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	10061-02-6	"trans-1,3-Dichloropropene "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	1330-20-7	"Xylenes, Total "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	591-78-6	2-Hexanone	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	67-64-1	Acetone	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	71-43-2	Benzene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-27-4	Bromodichloromethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-25-2	Bromoform	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	74-83-9	Bromomethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-15-0	Carbon Disulfide	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	56-23-5	Carbon Tetrachloride	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	108-90-7	Chlorobenzene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-00-3	Chloroethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	67-66-3	Chloroform	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	74-87-3	Chloromethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	124-48-1	Dibromochloromethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	100-41-4	Ethylbenzene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	78-93-3	Methyl Ethyl Ketone (2-Butanone)	SW5030	SW8260	ND	0.0	UG/L	R
24-MW-02	08/29/95	5244063	108-10-1	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-09-2	Methylene Chloride	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	100-42-5	Styrene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	127-18-4	Tetrachloroethylene(PCE)	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	108-88-3	Toluene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	79-01-6	Trichloroethylene (TCE)	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244063	75-01-4	Vinyl Chloride	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	120-82-1	"1,2,4-Trichlorobenzene "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	95-50-1	"1,2-Dichlorobenzene"	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	541-73-1	"1,3-Dichlorobenzene"	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	106-46-7	"1,4-Dichlorobenzene"	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	95-95-4	"2,4,5-Trichlorophenol "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	88-06-2	"2,4,6-Trichlorophenol "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	120-83-2	"2,4-Dichlorophenol "	SW3520	SW8270	ND	0.0	UG/L	UJ

FULLLOCID	LODATE	LABLOTCTL	CASNUM	COMPNAME	EXMCODE	ANMCODE	PARVAL		UNITMEAS	ET QUALIFIER
24-MW-02	08/29/95	5244049	105-67-9	"2,4-Dimethylphenol "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	51-28-5	"2,4-Dinitrophenol "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	121-14-2	"2,4-Dinitrotoluene "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	606-20-2	"2,6-Dinitrotoluene "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	91-94-1	"3,3'-Dichlorobenzidine "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	534-52-1	"4,6-Dinitro-2-Methylphenol "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	191-24-2	"Benzo(g,h,i)perylene"	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	53-70-3	"Dibenz(a,h)Anthracene "	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	193-39-5	"Indeno(1,2,3-c,d)pyrene"	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	91-58-7	2-Chloronaphthalene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	95-57-8	2-Chlorophenol	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	91-57-6	2-Methylnaphthalene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	95-48-7	2-Methylphenol (o-Cresol)	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	88-74-4	2-Nitroaniline	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	88-75-5	2-Nitrophenol	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	99-09-2	3-Nitroaniline	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	101-55-3	4-Bromophenyl Phenyl Ether	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	59-50-7	4-Chloro-3-Methylphenol	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	106-47-8	4-Chloroaniline	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	7005-72-3	4-Chlorophenyl Phenyl Ether	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	106-44-5	4-Methylphenol (p-Cresol)	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	100-01-6	4-Nitroaniline	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	100-02-07	4-Nitrophenol	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	83-32-9	Acenaphthene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	208-96-8	Acenapthylene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	120-12-7	Anthracene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	56-55-3	Benzo(a)anthracene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	50-32-8	Benzo(a)pyrene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	205-99-2	Benzo(b)fluoranthene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	207-08-9	Benzo(k)fluoranthene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	85-68-7	Benzyl Butyl Phthalate	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	111-91-1	bis(2-Chloroethoxy) Methane	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	111-44-4	bis(2-Chloroethyl) Ether (2-Chloroethyl Ether	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	108-60-1	bis(2-Chloroisopropyl) Ether	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	117-81-7	bis(2-Ethylhexyl) Phthalate	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	86-74-8	Carbazole	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	218-01-9	Chrysene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	84-74-2	Di-n-Butyl Phthalate	SW3520	SW8270	=	18	UG/L	J
24-MW-02	08/29/95	5244049	117-84-0	Di-n-octyl Phthalate	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	132-64-9	Dibenzofuran	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	84-66-2	Diethyl Phthalate	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	131-11-3	Dimethyl Phthalate	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	206-44-0	Fluoranthene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	86-73-7	Fluorene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	118-74-1	Hexachlorobenzene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	87-68-3	Hexachlorobutadiene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	77-47-4	Hexachlorocyclopentadiene	SW3520	SW8270	ND	0.0	UG/L	UJ

FULLLOCID	LODATE	LABLOTCTL	CASNUM	COMPNAME	EXMCODE	ANMCODE	PARVAL		UNITMEAS	ET QUALIFIER
24-MW-02	08/29/95	5244049	67-72-1	Hexachloroethane	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	78-59-1	Isophorone	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	621-64-7	N-Nitrosodi-n-Propylamine	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	86-30-6	N-Nitrosodiphenylamine	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	91-20-3	Naphthalene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	98-95-3	Nitrobenzene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	87-86-5	Pentachlorophenol	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	85-01-8	Phenanthrene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	108-95-2	Phenol	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02	08/29/95	5244049	129-00-0	Pyrene	SW3520	SW8270	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	540-59-0	" 1,2-Dichloroethene, total"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	71-55-6	"1,1,1-Trichloroethane "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	79-34-5	"1,1,2,2-Tetrachloroethane "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	79-00-5	"1,1,2-Trichloroethane"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-34-3	"1,1-Dichloroethane"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-35-4	"1,1-Dichloroethene "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	107-06-2	"1,2-Dichloroethane"	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	78-87-5	"1,2-Dichloropropane "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	10061-01-5	"cis-1,3-Dichloropropene "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	10061-02-6	"trans-1,3-Dichloropropene "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	1330-20-7	"Xylenes, Total "	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	591-78-6	2-Hexanone	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	67-64-1	Acetone	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	71-43-2	Benzene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-27-4	Bromodichloromethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-25-2	Bromoform	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	74-83-9	Bromomethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-15-0	Carbon Disulfide	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	56-23-5	Carbon Tetrachloride	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	108-90-7	Chlorobenzene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-00-3	Chloroethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	67-66-3	Chloroform	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	74-87-3	Chloromethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	124-48-1	Dibromochloromethane	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	100-41-4	Ethylbenzene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	78-93-3	Methyl Ethyl Ketone (2-Butanone)	SW5030	SW8260	ND	0.0	UG/L	R
24-MW-02-C	08/29/95	5244063	108-10-1	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-09-2	Methylene Chloride	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	100-42-5	Styrene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	127-18-4	Tetrachloroethylene(PCE)	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	108-88-3	Toluene	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	79-01-6	Trichloroethylene (TCE)	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-02-C	08/29/95	5244063	75-01-4	Vinyl Chloride	SW5030	SW8260	ND	0.0	UG/L	UJ
24-MW-03	08/29/95	5243097	7440-38-2	Arsenic	SW3005	SW6010	TR	0.010	MG/L	U
24-MW-03	08/29/95	5248039	75-99-0	Dalapon	METHOD	SW8151	=	2.2	UG/L	U
24-MW-03	08/29/95	5248039	88-85-7	Dinoseb	METHOD	SW8151	ND	0.0	UG/L	R

Quanterra Environmental Services

Quanterra Incorporated
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ANALYTICAL REPORT

PROJECT NO. 55551.000

Eglin AFB - AOC 24

Kathy Janiga

EARTH TECHNOLOGY CORPORATION

QUANTERRA INCORPORATED
Certification Numbers: E84059,HRS84297
FDEP CompQAP: 870270G

Jeff Graham
Project Manager

September 18, 1995

Quanterra
Environmental
Services

CASE NARRATIVE

LABORATORY ID NUMBER: B5H300111

GC Semivolatiles - Method 8141

The surrogate solution used for the preparation of malathion for method 8141 was identified to be outside the recommended storage period of six months by one day. Since the holding time had expired, the analysis was performed which resulted in acceptable surrogate recoveries. A new surrogate solution was created for future use.

GC/MS Semivolatiles - Method 8270

The percent recovery for non-action compounds in the laboratory control sample associated with quality control batch number 5244049 was found to be outside the control limits. All calculations were checked and found to be correct so no further action was taken.

EXECUTIVE SUMMARY - Detection Highlights

Quanterra Environmental Services

B5H300111

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD
24-MW-02 08/29/95 13:00				
Dalapon	1.3 J	2.0	ug/L	SWDFT 8151
Di-n-butyl phthalate	18	10	ug/L	SW846 8270A
24-MW-02 08/29/95 13:00				
Arsenic	0.0062 J	0.010	mg/L	SW846 6010A
24-MW-01 08/29/95 14:30				
Arsenic	0.0074 J	0.010	mg/L	SW846 6010A
24-MW-03 08/29/95 15:20				
Dalapon	2.2 *	2.0	ug/L	SWDFT 8151
24-MW-03 08/29/95 16:18				
Arsenic	0.0043 J	0.010	mg/L	SW846 6010A

Quanterra
Environmental Services

ANALYTICAL METHODS SUMMARY

B5H300111

Parameters	Methods
Volatile Organics by GC/MS	SW846 8260
Chlorinated Herbicides by GC	SWDFT 8151
Organophosphorous Compounds by GC	SW846 8141
Organochlorine Pesticides and PCB's	SW846 8080
Semivolatile Organic Compounds by GC/MS	SW846 8270A
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010A

References:

SWDFT "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Draft Methods.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and Final Update I (7/92).

SAMPLE SUMMARY

Quanterra Environmental Services

The analytical results of the samples listed below are presented on the following pages.

WO #	LABORATORY ID	SAMPLE IDENTIFICATION	DATE/TIME SAMPLED
C0VEV	B5H300111-001	24-MW-02	8/29/95 13:00
C0VEW	B5H300111-002	24-MW-02-C	8/29/95 13:00
C0VF0	B5H300111-003	24-MW-02	8/29/95 13:00
C0VF2	B5H300111-004	24-MW-01	8/29/95 14:30
C0VF3	B5H300111-005	24-MW-01	8/29/95 14:30
C0VF4	B5H300111-006	24-MW-03	8/29/95 15:20
C0VF5	B5H300111-007	24-MW-03	8/29/95 16:18

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

) #: C0VEV103
AB #: B5H300111-001
ATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Volatiles

ARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
cetone	ND	20	SW846 8260	08/31/95	5244063
enzene	ND	1.0	SW846 8260	08/31/95	5244063
romodichloromethane	ND	1.0	SW846 8260	08/31/95	5244063
romoform	ND	1.0	SW846 8260	08/31/95	5244063
romomethane	ND	5.0	SW846 8260	08/31/95	5244063
-Butanone	ND	20	SW846 8260	08/31/95	5244063
arbon disulfide	ND	10	SW846 8260	08/31/95	5244063
arbon tetrachloride	ND	1.0	SW846 8260	08/31/95	5244063
ilorobenzene	ND	1.0	SW846 8260	08/31/95	5244063
ibromochloromethane	ND	1.0	SW846 8260	08/31/95	5244063
iloroethane	ND	5.0	SW846 8260	08/31/95	5244063
iloroform	ND	5.0	SW846 8260	08/31/95	5244063
iloromethane	ND	1.0	SW846 8260	08/31/95	5244063
,1-Dichloroethane	ND	5.0	SW846 8260	08/31/95	5244063
,2-Dichloroethane	ND	1.0	SW846 8260	08/31/95	5244063
,1-Dichloroethene	ND	5.0	SW846 8260	08/31/95	5244063
,2-Dichloroethene (total)	ND	5.0	SW846 8260	08/31/95	5244063
,2-Dichloropropane	ND	5.0	SW846 8260	08/31/95	5244063
is-1,3-Dichloropropene	ND	1.0	SW846 8260	08/31/95	5244063
rans-1,3-Dichloropropene	ND	1.0	SW846 8260	08/31/95	5244063
thylbenzene	ND	5.0	SW846 8260	08/31/95	5244063

URROGATE RECOVERY	%	ACCEPTABLE LIMITS
romofluorobenzene	97	(86 - 115)
ibromofluoromethane	104	(86 - 118)
oluene-d8	103	(88 - 110)

: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV103
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Volatiles

2 OF 2

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
2-Hexanone	ND	10	SW846 8260	08/31/95	5244063
Methylene chloride	ND	5.0	SW846 8260	08/31/95	5244063
4-Methyl-2-pentanone	ND	10	SW846 8260	08/31/95	5244063
Styrene	ND	5.0	SW846 8260	08/31/95	5244063
1,1,2,2-Tetrachloroethane	ND	1.0	SW846 8260	08/31/95	5244063
Tetrachloroethene	ND	1.0	SW846 8260	08/31/95	5244063
Toluene	ND	5.0	SW846 8260	08/31/95	5244063
1,1,1-Trichloroethane	ND	5.0	SW846 8260	08/31/95	5244063
1,1,2-Trichloroethane	ND	5.0	SW846 8260	08/31/95	5244063
Trichloroethene	ND	1.0	SW846 8260	08/31/95	5244063
Vinyl chloride	ND	1.0	SW846 8260	08/31/95	5244063
Xylenes (total)	ND	1.0	SW846 8260	08/31/95	5244063

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	97	(86 - 115)
Dibromofluoromethane	104	(86 - 118)
Toluene-d8	103	(88 - 110)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV105
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
2,4-D	ND	4.0	SWDFT 8151	09/05-09/08/95	5248039
Dalapon	1.3 J	2.0	SWDFT 8151	09/05-09/08/95	5248039
2,4-DB	ND	4.0	SWDFT 8151	09/05-09/08/95	5248039
Dicamba	ND	2.0	SWDFT 8151	09/05-09/08/95	5248039
Dichlorprop	ND	4.0	SWDFT 8151	09/05-09/08/95	5248039
Dinoseb	ND	0.60	SWDFT 8151	09/05-09/08/95	5248039
MCPA	ND	400	SWDFT 8151	09/05-09/08/95	5248039
MCPP	ND	400	SWDFT 8151	09/05-09/08/95	5248039
Pentachlorophenol	ND	1.0	SWDFT 8151	09/05-09/08/95	5248039
Picloram	ND	1.0	SWDFT 8151	09/05-09/08/95	5248039

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-Dichlorophenylacetic acid	88	(40 - 160)

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT
J ESTIMATED VALUE. (DETECTED), BUT BELOW QUANTITATION LIMIT.

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV106
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Malathion	ND	2.0	SW846 8141	09/01-09/08/95	5244057

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Triphenyl phosphate	113	(38 - 146)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
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EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV104
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

1 OF 2

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Aldrin	ND	0.050	SW846 8080	09/01-09/07/95	5244059
Aroclor 1016	ND	0.50	SW846 8080	09/01-09/07/95	5244059
Aroclor 1221	ND	0.50	SW846 8080	09/01-09/07/95	5244059
Aroclor 1232	ND	0.50	SW846 8080	09/01-09/07/95	5244059
Aroclor 1242	ND	0.50	SW846 8080	09/01-09/07/95	5244059
Aroclor 1248	ND	0.50	SW846 8080	09/01-09/07/95	5244059
Aroclor 1254	ND	0.50	SW846 8080	09/01-09/07/95	5244059
Aroclor 1260	ND	0.50	SW846 8080	09/01-09/07/95	5244059
alpha-BHC	ND	0.050	SW846 8080	09/01-09/07/95	5244059
beta-BHC	ND	0.050	SW846 8080	09/01-09/07/95	5244059
delta-BHC	ND	0.050	SW846 8080	09/01-09/07/95	5244059
gamma-BHC (Lindane)	ND	0.050	SW846 8080	09/01-09/07/95	5244059
4,4'-DDD	ND	0.10	SW846 8080	09/01-09/07/95	5244059
4,4'-DDE	ND	0.10	SW846 8080	09/01-09/07/95	5244059
4,4'-DDT	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Dieldrin	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Endrin	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Endrin aldehyde	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Endosulfan I	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Endosulfan II	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Endosulfan sulfate	ND	0.10	SW846 8080	09/01-09/07/95	5244059

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Dibutylchlorendate	87	(18 - 129)
Tetrachloro-m-xylene	95	(32 - 122)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV104
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

2 OF 2

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Heptachlor	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Heptachlor epoxide	ND	0.10	SW846 8080	09/01-09/07/95	5244059
Methoxychlor	ND	1.0	SW846 8080	09/01-09/07/95	5244059
Toxaphene	ND	3.0	SW846 8080	09/01-09/07/95	5244059
alpha-Chlordane	ND	2.0	SW846 8080	09/01-09/07/95	5244059
gamma-Chlordane	ND	2.0	SW846 8080	09/01-09/07/95	5244059
Endrin ketone	ND	0.050	SW846 8080	09/01-09/07/95	5244059
Hexachlorobenzene	ND	1.0	SW846 8080	09/01-09/07/95	5244059

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Dibutylchlorendate	87	(18 - 129)
Tetrachloro-m-xylene	95	(32 - 122)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

000010

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

O #: C0VEV101
AB #: B5H300111-001
ATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Semi-Volatiles

ARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
cenaphthene	ND	10	SW846 8270A	09/01-09/08/95	5244049
cenaphthylene	ND	10	SW846 8270A	09/01-09/08/95	5244049
nthracene	ND	10	SW846 8270A	09/01-09/08/95	5244049
enzo(a)anthracene	ND	10	SW846 8270A	09/01-09/08/95	5244049
enzo(b)fluoranthene	ND	10	SW846 8270A	09/01-09/08/95	5244049
enzo(k)fluoranthene	ND	10	SW846 8270A	09/01-09/08/95	5244049
enzo(ghi)perylene	ND	10	SW846 8270A	09/01-09/08/95	5244049
enzo(a)pyrene	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Bromophenyl phenyl ether	ND	10	SW846 8270A	09/01-09/08/95	5244049
utyl benzyl phthalate	ND	10	SW846 8270A	09/01-09/08/95	5244049
arbazole	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Chloroaniline	ND	10	SW846 8270A	09/01-09/08/95	5244049
is(2-Chloroethoxy)methane	ND	10	SW846 8270A	09/01-09/08/95	5244049
is(2-Chloroethyl) ether	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Chloro-3-methylphenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Chloronaphthalene	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Chlorophenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Chlorophenyl phenyl ether	ND	10	SW846 8270A	09/01-09/08/95	5244049
,2'-oxybis(1-Chloropropane)	ND	10	SW846 8270A	09/01-09/08/95	5244049
hrysene	ND	10	SW846 8270A	09/01-09/08/95	5244049
ibenz(a,h)anthracene	ND	10	SW846 8270A	09/01-09/08/95	5244049

URROGATE RECOVERY	%	ACCEPTABLE LIMITS
itrobenzene-d5	92	(26 - 131)
-Fluorobiphenyl	85	(27 - 119)
erphenyl-d14	99	(10 - 165)
-Fluorophenol	64	(10 - 116)
henol-d5	74	(10 - 175)
2,4,6-Tribromophenol	94	(10 - 155)

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV101
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Dibenzofuran	ND	10	SW846 8270A	09/01-09/08/95	5244049
Di-n-butyl phthalate	18	10	SW846 8270A	09/01-09/08/95	5244049
1,2-Dichlorobenzene	ND	10	SW846 8270A	09/01-09/08/95	5244049
1,3-Dichlorobenzene	ND	10	SW846 8270A	09/01-09/08/95	5244049
1,4-Dichlorobenzene	ND	10	SW846 8270A	09/01-09/08/95	5244049
3,3'-Dichlorobenzidine	ND	20	SW846 8270A	09/01-09/08/95	5244049
2,4-Dichlorophenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
Diethyl phthalate	ND	10	SW846 8270A	09/01-09/08/95	5244049
2,4-Dimethylphenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
Dimethyl phthalate	ND	10	SW846 8270A	09/01-09/08/95	5244049
4,6-Dinitro-2-methylphenol	ND	50	SW846 8270A	09/01-09/08/95	5244049
2,4-Dinitrophenol	ND	50	SW846 8270A	09/01-09/08/95	5244049
2,4-Dinitrotoluene	ND	10	SW846 8270A	09/01-09/08/95	5244049
2,6-Dinitrotoluene	ND	10	SW846 8270A	09/01-09/08/95	5244049
Di-n-octyl phthalate	ND	10	SW846 8270A	09/01-09/08/95	5244049
bis(2-Ethylhexyl) phthalate	ND	10	SW846 8270A	09/01-09/08/95	5244049
Fluoranthene	ND	10	SW846 8270A	09/01-09/08/95	5244049
Fluorene	ND	10	SW846 8270A	09/01-09/08/95	5244049
Hexachlorobenzene	ND	10	SW846 8270A	09/01-09/08/95	5244049
Hexachlorobutadiene	ND	10	SW846 8270A	09/01-09/08/95	5244049
Hexachlorocyclopentadiene	ND	10	SW846 8270A	09/01-09/08/95	5244049

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Nitrobenzene-d5	92	(26 - 131)
2-Fluorobiphenyl	85	(27 - 119)
Terphenyl-d14	99	(10 - 165)
2-Fluorophenol	64	(10 - 116)
Phenol-d5	74	(10 - 175)
2,4,6-Tribromophenol	94	(10 - 155)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

/O #: C0VEV101
AB #: B5H300111-001
ATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Semi-Volatiles

3 OF 4

ARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
exachloroethane	ND	10	SW846 8270A	09/01-09/08/95	5244049
ndeno(1,2,3-cd)pyrene	ND	10	SW846 8270A	09/01-09/08/95	5244049
sophorone	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Methylnaphthalene	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Methylphenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Methylphenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
aphthalene	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Nitroaniline	ND	50	SW846 8270A	09/01-09/08/95	5244049
-Nitroaniline	ND	50	SW846 8270A	09/01-09/08/95	5244049
-Nitroaniline	ND	50	SW846 8270A	09/01-09/08/95	5244049
itrobenzene	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Nitrophenol	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Nitrophenol	ND	50	SW846 8270A	09/01-09/08/95	5244049
-Nitrosodi-n-propylamine	ND	10	SW846 8270A	09/01-09/08/95	5244049
-Nitrosodiphenylamine	ND	10	SW846 8270A	09/01-09/08/95	5244049
entachlorophenol	ND	50	SW846 8270A	09/01-09/08/95	5244049
henanthrene	ND	10	SW846 8270A	09/01-09/08/95	5244049
henol	ND	10	SW846 8270A	09/01-09/08/95	5244049
yrene	ND	10	SW846 8270A	09/01-09/08/95	5244049
,2,4-Trichlorobenzene	ND	10	SW846 8270A	09/01-09/08/95	5244049
,4,5-Trichlorophenol	ND	10	SW846 8270A	09/01-09/08/95	5244049

URROGATE RECOVERY	%	ACCEPTABLE LIMITS
itrobenzene-d5	92	(26 - 131)
-Fluorobiphenyl	85	(27 - 119)
erphenyl-d14	99	(10 - 165)
-Fluorophenol	64	(10 - 116)
henol-d5	74	(10 - 175)
,4,6-Tribromophenol	94	(10 - 155)

E: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VEV101
LAB #: B5H300111-001
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
2,4,6-Trichlorophenol	ND	10	SW846 8270A	09/01-09/08/95	5244049

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Nitrobenzene-d5	92	(26 - 131)
2-Fluorobiphenyl	85	(27 - 119)
Terphenyl-d14	99	(10 - 165)
2-Fluorophenol	64	(10 - 116)
Phenol-d5	74	(10 - 175)
2,4,6-Tribromophenol	94	(10 - 155)

NOTE: AS RECEIVED

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02-C

WO #: C0VEW101
LAB #: B5H300111-002
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Acetone	ND	20	SW846 8260	08/31/95	5244063
Benzene	ND	1.0	SW846 8260	08/31/95	5244063
Bromodichloromethane	ND	1.0	SW846 8260	08/31/95	5244063
Bromoform	ND	1.0	SW846 8260	08/31/95	5244063
Bromomethane	ND	5.0	SW846 8260	08/31/95	5244063
2-Butanone	ND	20	SW846 8260	08/31/95	5244063
Carbon disulfide	ND	10	SW846 8260	08/31/95	5244063
Carbon tetrachloride	ND	1.0	SW846 8260	08/31/95	5244063
Chlorobenzene	ND	1.0	SW846 8260	08/31/95	5244063
Dibromochloromethane	ND	1.0	SW846 8260	08/31/95	5244063
Chloroethane	ND	5.0	SW846 8260	08/31/95	5244063
Chloroform	ND	5.0	SW846 8260	08/31/95	5244063
Chloromethane	ND	1.0	SW846 8260	08/31/95	5244063
1,1-Dichloroethane	ND	5.0	SW846 8260	08/31/95	5244063
1,2-Dichloroethane	ND	1.0	SW846 8260	08/31/95	5244063
1,1-Dichloroethene	ND	5.0	SW846 8260	08/31/95	5244063
1,2-Dichloroethene (total)	ND	5.0	SW846 8260	08/31/95	5244063
1,2-Dichloropropane	ND	5.0	SW846 8260	08/31/95	5244063
cis-1,3-Dichloropropene	ND	1.0	SW846 8260	08/31/95	5244063
trans-1,3-Dichloropropene	ND	1.0	SW846 8260	08/31/95	5244063
Ethylbenzene	ND	5.0	SW846 8260	08/31/95	5244063

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	96	(86 - 115)
Dibromofluoromethane	103	(86 - 118)
Toluene-d8	100	(88 - 110)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02-C

WO #: C0VEW101
LAB #: B5H300111-002
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

GC/MS Volatiles

2 OF 2

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
2-Hexanone	ND	10	SW846 8260	08/31/95	5244063
Methylene chloride	ND	5.0	SW846 8260	08/31/95	5244063
4-Methyl-2-pentanone	ND	10	SW846 8260	08/31/95	5244063
Styrene	ND	5.0	SW846 8260	08/31/95	5244063
1,1,2,2-Tetrachloroethane	ND	1.0	SW846 8260	08/31/95	5244063
Tetrachloroethene	ND	1.0	SW846 8260	08/31/95	5244063
Toluene	ND	5.0	SW846 8260	08/31/95	5244063
1,1,1-Trichloroethane	ND	5.0	SW846 8260	08/31/95	5244063
1,1,2-Trichloroethane	ND	5.0	SW846 8260	08/31/95	5244063
Trichloroethene	ND	1.0	SW846 8260	08/31/95	5244063
Vinyl chloride	ND	1.0	SW846 8260	08/31/95	5244063
Xylenes (total)	ND	1.0	SW846 8260	08/31/95	5244063

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	96	(86 - 115)
Dibromofluoromethane	103	(86 - 118)
Toluene-d8	100	(88 - 110)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-02

WO #: C0VF0
LAB #: B5H300111-003
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 13:00
DATE RECEIVED: 8/30/95

- - - - - - - - - - - - - - - - - - - REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Arsenic	0.0062 J	0.010	mg/L	SW846 6010A	9/01/95	5243097

NOTE: AS RECEIVED
J ESTIMATED VALUE. (DETECTED), BUT BELOW QUANTITATION LIMIT.

000017

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-01

WO #: C0VF2101
LAB #: B5H300111-004
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 14:30
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
2,4-D	ND	4.0	SWDFT 8151	09/05-09/08/95	5248039
Dalapon	ND	2.0	SWDFT 8151	09/05-09/08/95	5248039
2,4-DB	ND	4.0	SWDFT 8151	09/05-09/08/95	5248039
Dicamba	ND	2.0	SWDFT 8151	09/05-09/08/95	5248039
Dichlorprop	ND	4.0	SWDFT 8151	09/05-09/08/95	5248039
Dinoseb	ND	0.60	SWDFT 8151	09/05-09/08/95	5248039
MCPA	ND	400	SWDFT 8151	09/05-09/08/95	5248039
MCPP	ND	400	SWDFT 8151	09/05-09/08/95	5248039
Pentachlorophenol	ND	1.0	SWDFT 8151	09/05-09/08/95	5248039
Picloram	ND	1.0	SWDFT 8151	09/05-09/08/95	5248039

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-Dichlorophenylacetic acid	96	(40 - 160)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-01

WO #: C0VF2102
LAB #: B5H300111-004
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 14:30
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Malathion	ND	2.0	SW846 8141	09/01-09/09/95	5244057

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Triphenyl phosphate	88	(38 - 146)

TE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

000013

Quanterra
Environmental
Services

EARTH TECHNOLOGY CORPORATION

24-MW-01

WO #: C0VF3
LAB #: B5H300111-005
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 14:30
DATE RECEIVED: 8/30/95

- REQUESTED METALS -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Arsenic	0.0074 J	0.010	mg/L	SW846 6010A	9/01/95	5243097

NOTE: AS RECEIVED
J ESTIMATED VALUE. (DETECTED), BUT BELOW QUANTITATION LIMIT.

000020

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-03

WO #: C0VF4101
LAB #: B5H300111-006
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 15:20
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
2,4-D	ND	4.0	SWDFT 8151	09/05-09/11/95	5248039
Dalapon	2.2 *	2.0	SWDFT 8151	09/05-09/11/95	5248039
2,4-DB	ND	4.0	SWDFT 8151	09/05-09/11/95	5248039
Dicamba	ND	2.0	SWDFT 8151	09/05-09/11/95	5248039
Dichlorprop	ND	4.0	SWDFT 8151	09/05-09/11/95	5248039
Dinoseb	ND	0.60	SWDFT 8151	09/05-09/11/95	5248039
MCPA	ND	400	SWDFT 8151	09/05-09/11/95	5248039
MCPP	ND	400	SWDFT 8151	09/05-09/11/95	5248039
Pentachlorophenol	ND	1.0	SWDFT 8151	09/05-09/11/95	5248039
Picloram	ND	1.0	SWDFT 8151	09/05-09/11/95	5248039

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-Dichlorophenylacetic acid	76	(40 - 160)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT
* QUANTITATIVE SECOND COLUMN CONFIRMATION NOT CONCLUSIVE.

000021

Quanterra
Environmental Services

EARTH TECHNOLOGY CORPORATION

24-MW-03

WO #: C0VF4102
LAB #: B5H300111-006
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 15:20
DATE RECEIVED: 8/30/95

GC Semi-Volatiles

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	METHOD	EXTRACTION-ANALYSIS DATE	QC BATCH
Malathion	ND	2.0	SW846 8141	09/01-09/09/95	5244057

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Triphenyl phosphate	92	(38 - 146)

NOTE: AS RECEIVED
ND NOT DETECTED AT THE STATED REPORTING LIMIT

000022

Quanterra
Environmental
Services

EARTH TECHNOLOGY CORPORATION

24-MW-03

NO #: C0VF5
LAB #: B5H300111-007
MATRIX: WATER

DATE SAMPLED: 8/29/95
TIME SAMPLED: 16:18
DATE RECEIVED: 8/30/95

- REQUESTED METALS - - - - - - - - - - - - - - - - - - -

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE	QC BATCH
Arsenic	0.0043 J	0.010	mg/L	SW846 6010A	9/01/95	5243097

TE: AS RECEIVED
J ESTIMATED VALUE. (DETECTED), BUT BELOW QUANTITATION LIMIT.

Quanterra
Environmental
Services

Quality Control Summary

Quanterra QC Program Summary

Method Blanks

Laboratory Control Samples

Matrix Spike/Matrix Spike Duplicates

Chain-of-Custody

Quanterra
Environmental Services

Quanterra Quality Control Program Summary

Quanterra Environmental Services considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with analytical results. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow. Further documentation of specific policies and procedures in use are available, upon request, from the Quanterra Quality Control Department.

The program described below provides Quanterra's interpretation of QC requirements described in SW-846, 3rd edition -Final Update II. Additional interpretations specific to other aspects of methods performed, such as instrument calibration and bench procedures, are described in program-specific documents (e.g. US Corps of Engineers, AFCEE, etc.) and associated method standard operating procedures. Where explicit program requirements or project requirements exist, certain elements of the Quanterra QC Program may be superseded by these requirements.

Elements of the Quanterra QC Program

Where other clear regulatory guidance, contract specifications, or client requirements are not available, the Quanterra QC Program provides guidance for Batch QC requirements. The Quality Control Batch is a set of up to 20 field samples of similar matrix, which are processed together under the same conditions, within the same time frame. Included in each Quality Control Batch is a Method Blank, Laboratory Control Sample, and Matrix Spike Duplicate. For methods that require independent sample preparation prior to analysis, the QC Batch is defined at the preparation stage. For methods that do not require independent sample preparation, the QC Batch is defined at the instrument. The QC Batch Number is provided on each result page in association with the parameter(s) presented, and may be used to cross-reference sample results with the associated QC data.

Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interference and background contamination levels associated with each applicable analytical method. Method blanks include all aspects of actual laboratory procedures involving sample preparation and analysis, substituting analyte-free water or solid for the actual sample. Under normal circumstances, the Method Blank should not exhibit analytes of interest above the reported detection limit. Due to the presence of some analytes in a typical laboratory setting, the following common laboratory contaminants are exceptions to this rule, provided they are not present in the method blank at greater than five times the reporting limit.

Volatiles	Semi-Volatiles	Metals
Methylene chloride	Dimethyl phthalate	Calcium
Toluene	Diethyl phthalate	Magnesium
2-Butanone	Di-n-butyl-phthalate	Sodium
Acetone	Butyl benzyl phthalate	
	Bis (2-ethylhexyl) phthalate	

A method blank is performed with each analytical batch. A minimum of 5% of all laboratory analyses are method blanks.

Laboratory Control Sample (LCS) Evaluations

Known concentrations of designated matrix spike (target analyte) compounds are added to a method blank prior to extraction and analysis. Percent recovery determinations of individual target analytes in the LCS demonstrate the laboratory's method performance for the QC Batch relative to these target analytes (or other individual components represented by a subset of control analytes). Percent recovery data is displayed alongside acceptance criteria, that is typically derived from laboratory historical data. Failure of a Laboratory Control Sample to meet established recovery criteria for control analytes is cause for corrective actions to occur, which typically includes re-extraction and re-analysis of all samples associated with the QC Batch. An LCS is performed with each analytical batch. A minimum of 5% of all laboratory analyses are laboratory control samples.

Quanterra
Environmental Services

Quanterra Quality Control Program Summary (continued)

Surrogate Spike Recovery Evaluations

For GC and GC/MS analyses, known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added to sample fractions prior to sample extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is one indication of the overall method efficiency for the individual sample. The surrogate spike recovery data is displayed alongside acceptance limits at the bottom of each applicable analytical result report page. Where sufficient laboratory-generated data does not yet exist to determine appropriate control limits, advisory limits may be enacted until sufficient data is collected to allow implementation of control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Evaluations

In conjunction with the analysis of a client-provided field sample, a known concentration of designated matrix spike compounds (target analytes) are added to two aliquots of the actual sample. Percent recovery determinations are calculated from both spiked aliquots, using target analyte concentrations already present in the actual sample as a baseline. The percent recovery determinations indicate the accuracy of the method specific to the target analytes (or other individual components represented by a subset of control analytes) in the individual sample matrix. Comparison of the percent recoveries in the two spiked aliquots yields a relative percent difference (RPD). Percent recovery and relative percent difference data is displayed alongside historical criteria, that may be used to judge individual sample matrix effects for specific analytes. MS/MSD data is evaluated by the laboratory with respect to the individual sample matrix. In cases where MS/MSD data indicate sample method performance outside of historical criteria, the laboratory control sample results are referenced to ensure acceptable method performance by the laboratory for the sample batch. For analyses which are inappropriately suited for matrix spikes (e.g. pH), non-spiked duplicate analyses are performed to generate precision data. Matrix spike duplicates are typically performed on at least one sample within each analytical batch. A minimum of 10% of all laboratory analyses are matrix spikes or duplicates.

Corrective Action Evaluations

The goal of the Quanterra Quality Control Program is to generate data that demonstrates process control, and allows for client usability of data. Where the analytical process is demonstrated to vary from established criteria, or client requirements have not been met, data evaluation resulting in corrective action may be required. Corrective action may include re-preparation and/or reanalysis of field samples and QC samples. Where appropriate or necessary to allow proper interpretation of results presented in the final report, details of corrective actions taken during the laboratory processing of samples are presented as a case narrative at the front of the report. Alternatively, routine corrective action, such as reanalysis, may be footnoted on individual sample result pages.

Analytical Result Qualifier Flags

Where applicable , data qualifiers may be appended to analytical results in order to allow for proper interpretation of the result presented. Typically, the presence of data qualifier flag on an analytical result page is accompanied by a footnote explaining the qualifier. Common data qualifiers include, but are no limited to the following:

J -indicates an estimated concentration is reported due to method limitations such as matrix interference or instrumental detection limitations.

B -indicates the presence of a particular analyte in the associated laboratory method blank.

DIL -indicates percent recovery determination was not possible due to dilution associated with the sample matrix conditions or high target analyte concentrations.

X -indicates internal standards used for a GC or GC/MS analysis did not meet established criteria, typically due to a sample matrix effect.

E -indicates an estimated concentration is reported due to analyte response beyond the established instrumental calibration range, typically due to presence of a wide range of target analyte concentrations.

Quanterra
Environmental Services

METHOD BLANK REPORT

AB #: B5I010000-063

GC/MS VOLATILES

ARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
cetone	ND	10	8/31/95	5244063
enzene	ND	1.0	8/31/95	5244063
romodichloromethane	ND	1.0	8/31/95	5244063
romoform	ND	1.0	8/31/95	5244063
romomethane	ND	1.0	8/31/95	5244063
-Butanone	ND	10	8/31/95	5244063
arbon disulfide	ND	1.0	8/31/95	5244063
arbon tetrachloride	ND	1.0	8/31/95	5244063
hlorobenzene	ND	1.0	8/31/95	5244063
ibromochloromethane	ND	1.0	8/31/95	5244063
hloroethane	ND	1.0	8/31/95	5244063
hloroform	ND	1.0	8/31/95	5244063
hloromethane	ND	1.0	8/31/95	5244063
,1-Dichloroethane	ND	1.0	8/31/95	5244063
,2-Dichloroethane	ND	1.0	8/31/95	5244063
,1-Dichloroethene	ND	1.0	8/31/95	5244063
,2-Dichloroethene (total)	ND	1.0	8/31/95	5244063
,2-Dichloropropane	ND	1.0	8/31/95	5244063
is-1,3-Dichloropropene	ND	1.0	8/31/95	5244063
rans-1,3-Dichloropropene	ND	1.0	8/31/95	5244063
thylbenzene	ND	1.0	8/31/95	5244063
-Hexanone	ND	10	8/31/95	5244063
ethylene chloride	ND	1.0	8/31/95	5244063
-Methyl-2-pentanone	ND	10	8/31/95	5244063

URROGATE RECOVERY	%	ACCEPTABLE LIMITS
romofluorobenzene	95	(86 - 115)
ibromofluoromethane	103	(86 - 118)
oluene-d8	101	(88 - 110)

E:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: B5I010000-063

GC/MS VOLATILES

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
Styrene	ND	1.0	8/31/95	5244063
1,1,2,2-Tetrachloroethane	ND	1.0	8/31/95	5244063
Tetrachloroethene	ND	1.0	8/31/95	5244063
Toluene	ND	1.0	8/31/95	5244063
1,1,1-Trichloroethane	ND	1.0	8/31/95	5244063
1,1,2-Trichloroethane	ND	1.0	8/31/95	5244063
Trichloroethene	ND	1.0	8/31/95	5244063
Vinyl chloride	ND	1.0	8/31/95	5244063
Xylenes (total)	ND	1.0	8/31/95	5244063

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	95	(86 - 115)
Dibromofluoromethane	103	(86 - 118)
Toluene-d8	101	(88 - 110)

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: B5I050000-039

- GC SEMI-VOLATILES -

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
2,4-D	ND	4.0	9/05- 9/08/95	5248039
Dalapon	ND	2.0	9/05- 9/08/95	5248039
2,4-DB	ND	4.0	9/05- 9/08/95	5248039
Dicamba	ND	2.0	9/05- 9/08/95	5248039
Dichlorprop	ND	4.0	9/05- 9/08/95	5248039
Dinoseb	ND	0.60	9/05- 9/08/95	5248039
MCPA	ND	400	9/05- 9/08/95	5248039
MCPP	ND	400	9/05- 9/08/95	5248039
Pentachlorophenol	ND	1.0	9/05- 9/08/95	5248039
Picloram	ND	1.0	9/05- 9/08/95	5248039

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-Dichlorophenylacetic acid	88	(40 - 160)

TE:
ND NOT DETECTED AT THE STATED REPORTING LIMIT

000029

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: B5I010000-057

GC SEMI-VOLATILES

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
Malathion	ND	2.0	9/01- 9/06/95	5244057

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Triphenyl phosphate	80	(38 - 146)

NOTE:
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: B5I010000-059

GC SEMI-VOLATILES

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
Aldrin	ND	0.050	9/01- 9/07/95	5244059
alpha-BHC	ND	0.050	9/01- 9/07/95	5244059
beta-BHC	ND	0.050	9/01- 9/07/95	5244059
delta-BHC	ND	0.050	9/01- 9/07/95	5244059
gamma-BHC (Lindane)	ND	0.050	9/01- 9/07/95	5244059
alpha-Chlordane	ND	0.050	9/01- 9/07/95	5244059
gamma-Chlordane	ND	0.050	9/01- 9/07/95	5244059
4,4'-DDD	ND	0.050	9/01- 9/07/95	5244059
4,4'-DDE	ND	0.050	9/01- 9/07/95	5244059
4,4'-DDT	ND	0.050	9/01- 9/07/95	5244059
Dieldrin	ND	0.050	9/01- 9/07/95	5244059
Endosulfan I	ND	0.050	9/01- 9/07/95	5244059
Endosulfan II	ND	0.050	9/01- 9/07/95	5244059
Endosulfan sulfate	ND	0.050	9/01- 9/07/95	5244059
Endrin	ND	0.050	9/01- 9/07/95	5244059
Endrin aldehyde	ND	0.050	9/01- 9/07/95	5244059
Endrin ketone	ND	0.050	9/01- 9/07/95	5244059
Heptachlor	ND	0.050	9/01- 9/07/95	5244059
Heptachlor epoxide	ND	0.050	9/01- 9/07/95	5244059
Hexachlorobenzene	ND	1.0	9/01- 9/07/95	5244059
Methoxychlor	ND	0.10	9/01- 9/07/95	5244059
Aroclor 1016	ND	0.50	9/01- 9/07/95	5244059
Aroclor 1221	ND	0.50	9/01- 9/07/95	5244059
Aroclor 1232	ND	0.50	9/01- 9/07/95	5244059

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Dibutylchlorendate	125	(18 - 129)
Tetrachloro-m-xylene	93	(32 - 122)

TE:
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

METHOD BLANK REPORT

LAB #: B5I010000-059

GC SEMI-VOLATILES

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
Aroclor 1242	ND	0.50	9/01- 9/07/95	5244059
Aroclor 1248	ND	0.50	9/01- 9/07/95	5244059
Aroclor 1254	ND	0.50	9/01- 9/07/95	5244059
Aroclor 1260	ND	0.50	9/01- 9/07/95	5244059
Toxaphene	ND	3.0	9/01- 9/07/95	5244059

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Dibutylchlorendate	125	(18 - 129)
Tetrachloro-m-xylene	93	(32 - 122)

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: B5I010000-049

GC/MS SEMI-VOLATILES

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
Acenaphthene	ND	10	9/01- 9/07/95	5244049
Acenaphthylene	ND	10	9/01- 9/07/95	5244049
Anthracene	ND	10	9/01- 9/07/95	5244049
Benzo(a)anthracene	ND	10	9/01- 9/07/95	5244049
Benzo(b)fluoranthene	ND	10	9/01- 9/07/95	5244049
Benzo(k)fluoranthene	ND	10	9/01- 9/07/95	5244049
Benzo(ghi)perylene	ND	10	9/01- 9/07/95	5244049
Benzo(a)pyrene	ND	10	9/01- 9/07/95	5244049
bis(2-Chloroethoxy)methane	ND	10	9/01- 9/07/95	5244049
bis(2-Chloroethyl) ether	ND	10	9/01- 9/07/95	5244049
2,2'-oxybis(1-Chloro-propane)	ND	10	9/01- 9/07/95	5244049
bis(2-Ethylhexyl) phthalate	ND	10	9/01- 9/07/95	5244049
4-Bromophenyl phenyl ether	ND	10	9/01- 9/07/95	5244049
Butyl benzyl phthalate	ND	10	9/01- 9/07/95	5244049
4-Chloroaniline	ND	10	9/01- 9/07/95	5244049
4-Chloro-3-methylphenol	ND	10	9/01- 9/07/95	5244049
2-Chloronaphthalene	ND	10	9/01- 9/07/95	5244049
2-Chlorophenol	ND	10	9/01- 9/07/95	5244049
4-Chlorophenyl phenyl ether	ND	10	9/01- 9/07/95	5244049
Chrysene	ND	10	9/01- 9/07/95	5244049
Dibenz(a,h)anthracene	ND	10	9/01- 9/07/95	5244049
Dibenzofuran	ND	10	9/01- 9/07/95	5244049
Di-n-butyl phthalate	ND	10	9/01- 9/07/95	5244049
1,2-Dichlorobenzene	ND	10	9/01- 9/07/95	5244049

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Nitrobenzene-d5	88	(26 - 131)
2-Fluorobiphenyl	80	(27 - 119)
Terphenyl-d14	87	(10 - 165)
2-Fluorophenol	73	(10 - 116)
Phenol-d5	75	(10 - 175)
2,4,6-Tribromophenol	86	(10 - 155)

NOTE:
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METHOD BLANK REPORT

LAB #: B5I010000-049

GC/MS SEMI-VOLATILES

PARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
1,3-Dichlorobenzene	ND	10	9/01- 9/07/95	5244049
1,4-Dichlorobenzene	ND	10	9/01- 9/07/95	5244049
3,3'-Dichlorobenzidine	ND	20	9/01- 9/07/95	5244049
2,4-Dichlorophenol	ND	10	9/01- 9/07/95	5244049
Diethyl phthalate	ND	10	9/01- 9/07/95	5244049
2,4-Dimethylphenol	ND	10	9/01- 9/07/95	5244049
Dimethyl phthalate	ND	10	9/01- 9/07/95	5244049
Di-n-octyl phthalate	ND	10	9/01- 9/07/95	5244049
4,6-Dinitro-2-methylphenol	ND	50	9/01- 9/07/95	5244049
2,4-Dinitrophenol	ND	50	9/01- 9/07/95	5244049
2,4-Dinitrotoluene	ND	10	9/01- 9/07/95	5244049
2,6-Dinitrotoluene	ND	10	9/01- 9/07/95	5244049
Fluoranthene	ND	10	9/01- 9/07/95	5244049
Fluorene	ND	10	9/01- 9/07/95	5244049
Hexachlorobenzene	ND	10	9/01- 9/07/95	5244049
Hexachlorobutadiene	ND	10	9/01- 9/07/95	5244049
Hexachlorocyclopentadiene	ND	10	9/01- 9/07/95	5244049
Hexachloroethane	ND	10	9/01- 9/07/95	5244049
Indeno(1,2,3-cd)pyrene	ND	10	9/01- 9/07/95	5244049
Isophorone	ND	10	9/01- 9/07/95	5244049
2-Methylnaphthalene	ND	10	9/01- 9/07/95	5244049
2-Methylphenol	ND	10	9/01- 9/07/95	5244049
4-Methylphenol	ND	10	9/01- 9/07/95	5244049
Naphthalene	ND	10	9/01- 9/07/95	5244049

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Nitrobenzene-d5	88	(26 - 131)
2-Fluorobiphenyl	80	(27 - 119)
Terphenyl-d14	87	(10 - 165)
2-Fluorophenol	73	(10 - 116)
Phenol-d5	75	(10 - 175)
2,4,6-Tribromophenol	86	(10 - 155)

NOTE:
ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

METHOD BLANK REPORT

AB #: B5I010000-049

GC/MS SEMI-VOLATILES

ARAMETER	RESULT (ug/L)	REPORTING LIMIT	EXTRACTION-ANALYSIS DATE	QC BATCH
-Nitroaniline	ND	50	9/01- 9/07/95	5244049
-Nitroaniline	ND	50	9/01- 9/07/95	5244049
-Nitroaniline	ND	50	9/01- 9/07/95	5244049
itrobenzene	ND	10	9/01- 9/07/95	5244049
-Nitrophenol	ND	10	9/01- 9/07/95	5244049
-Nitrophenol	ND	50	9/01- 9/07/95	5244049
-Nitrosodi-n-propylamine	ND	10	9/01- 9/07/95	5244049
-Nitrosodiphenylamine	ND	10	9/01- 9/07/95	5244049
entachlorophenol	ND	50	9/01- 9/07/95	5244049
henanthrene	ND	10	9/01- 9/07/95	5244049
henol	ND	10	9/01- 9/07/95	5244049
yrene	ND	10	9/01- 9/07/95	5244049
,2,4-Trichlorobenzene	ND	10	9/01- 9/07/95	5244049
,4,5-Trichlorophenol	ND	10	9/01- 9/07/95	5244049
,4,6-Trichlorophenol	ND	10	9/01- 9/07/95	5244049
arbazole	ND	10	9/01- 9/07/95	5244049

URROGATE RECOVERY	%	ACCEPTABLE LIMITS
itrobenzene-d5	88	(26 - 131)
-Fluorobiphenyl	80	(27 - 119)
erphenyl-d14	87	(10 - 165)
-Fluorophenol	73	(10 - 116)
henol-d5	75	(10 - 175)
,4,6-Tribromophenol	86	(10 - 155)

E:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental
Services

METHOD BLANK REPORT

LAB #: B5H300111

METALS

PARAMETER	RESULT	REPORTING LIMIT	UNIT	METHOD	PREPARATION - ANALYSIS DATE
		BATCH:5243097			
Arsenic	ND	0.010	mg/L	SW846 6010A	9/01/95

NOTE:

ND NOT DETECTED AT THE STATED REPORTING LIMIT

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244063
WORK ORDER: C0WFL
UNITS: ug/L

PREPARATION DATE: 8/31/95
DATE ANALYZED: 8/31/95

Mass Spec. Volatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
Bromochloromethane		20	20	100	(73-107)
Bromomethane		20	18	91	(18-138)
Chloroethane		20	21	103	(42-130)
Chloroform		20	20	98	(64-131)
Chloromethane		20	27	134 a	(42-119)
Dichlorodifluoromethane		20	22	112	(75-125)
1,1-Dichloroethane		20	20	99	(57-120)
2-Butanone		20	15	76	(18-157)
1,1-Dichloroethene	***	20	21	105	(56-128)
Acetone		20	19	95	(10-176)
Carbon disulfide		20	20	98	(49-146)
cis-1,2-Dichloroethene		20	20	101	(81-121)
trans-1,2-Dichloroethene		20	20	100	(62-123)
2,2-Dichloropropane		20	12	62 a	(75-125)
Methylene chloride		20	21	104	(51-134)
1,1,1-Trichloroethane		20	19	97	(74-115)
Trichlorofluoromethane		20	20	99	(67-111)
Vinyl chloride		20	23	113	(13-171)
Bromoform		20	18	91	(12-139)
Dibromochloromethane		20	19	96	(37-134)
Chlorobenzene	***	20	20	99	(74-123)
1,3-Dichloropropane		20	19	97	(70-120)
Ethylbenzene		20	20	99	(74-127)
2-Hexanone		20	14	72	(33-148)
Styrene		20	20	99	(19-151)
1,1,1,2-Tetrachloroethane		20	20	100	(74-108)
Tetrachloroethene		20	20	101	(68-127)
m-Xylene & p-Xylene		40	40	100	(76-127)
o-Xylene		20	19	97	(76-122)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	95	(86-115)
Dibromofluoromethane	102	(86-118)
Toluene-d8	101	(88-110)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
* Control parameters.
Spiked analyte recovery outside control limits.

000037

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244063
WORK ORDER: C0WFL
UNITS: ug/L

PREPARATION DATE: 8/31/95
DATE ANALYZED: 8/31/95

Mass Spec. Volatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
Benzene	***	20	20	99	(74-120)
Bromodichloromethane		20	20	98	(48-123)
Carbon tetrachloride		20	19	97	(52-124)
1,2-Dibromoethane		20	20	98	(90-114)
Dibromomethane		20	20	98	(69-127)
1,2-Dichloroethane		20	20	100	(73-122)
1,2-Dichloropropane		20	20	98	(68-115)
1,1-Dichloropropene		20	20	98	(85-115)
cis-1,3-Dichloropropene		20	19	97	(32-116)
trans-1,3-Dichloropropene		20	18	88	(34-124)
4-Methyl-2-pentanone		20	18	89	(46-175)
Toluene	***	20	20	98	(73-120)
1,1,2-Trichloroethane		20	20	98	(70-120)
Trichloroethene	***	20	20	99	(47-159)
Bromobenzene		20	21	105	(84-117)
n-Butylbenzene		20	20	99	(77-123)
sec-Butylbenzene		20	21	103	(73-123)
tert-Butylbenzene		20	21	103	(77-123)
2-Chlorotoluene		20	21	104	(73-107)
4-Chlorotoluene		20	20	102	(74-124)
1,2-Dibromo-3-chloropropane		20	21	104	(59-109)
1,3-Dichlorobenzene		20	20	102	(81-116)
1,4-Dichlorobenzene		20	20	100	(81-119)
1,2-Dichlorobenzene		20	20	102	(81-111)
Hexachlorobutadiene		20	22	111	(80-120)
Isopropylbenzene		20	21	103	(79-119)
p-Isopropyltoluene		20	20	102	(78-124)
Naphthalene		20	20	102	(78-130)
n-Propylbenzene		20	21	103	(83-117)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	95	(86-115)
Dibromofluoromethane	102	(86-118)
Toluene-d8	101	(88-110)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
*** Control parameters.

000033

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244063
WORK ORDER: C0WFL
UNITS: ug/L

PREPARATION DATE: 8/31/95
DATE ANALYZED: 8/31/95

Mass Spec. Volatiles

PARAMETER	TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
,1,2,2-Tetrachloroethane	20	21	104	(41-136)
,2,3-Trichlorobenzene	20	21	103	(81-137)
,2,4-Trichlorobenzene	20	21	103	(81-135)
,2,3-Trichloropropane	20	16	78	(76-119)
,2,4-Trimethylbenzene	20	21	103	(75-125)
,3,5-Trimethylbenzene	20	20	101	(75-112)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Bromofluorobenzene	95	(86-115)
Dibromofluoromethane	102	(86-118)
Toluene-d8	101	(88-110)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.

000089

Quanterra
Environmental
Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244057
WORK ORDER: C0WE6
UNITS: ug/L

PREPARATION DATE: 9/01/95
DATE ANALYZED: 9/08/95

GC Semivolatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
Disulfoton	***	20	8.3	41	(34-110)
Fensulfothion		20	17	84	(33-120)
Malathion		20	14	71	(57-105)
Azinphos-methyl		20	19	96	(64-193)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Triphenyl phosphate	96	(38-146)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
*** Control parameters.

000040

Quanterra
Environmental
Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244059
WORK ORDER: C0WEW
UNITS: ug/L

PREPARATION DATE: 9/01/95
DATE ANALYZED: 9/07/95

GC Semivolatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
alpha-BHC		0.12	0.11	91	(27-145)
gamma-BHC (Lindane)	***	0.12	0.12	97	(68-142)
beta-BHC		0.12	0.12	102	(64-124)
Heptachlor	***	0.12	0.12	98	(68-136)
delta-BHC		0.12	0.11	89	(40-160)
Aldrin	***	0.12	0.10	84	(65-125)
Heptachlor epoxide		0.12	0.10	86	(80-111)
alpha-Chlordane		0.12	0.11	90	(40-160)
gamma-Chlordane		0.12	0.11	88	(40-160)
Endosulfan I		0.12	0.10	86	(69-125)
4,4'-DDE		0.12	0.12	96	(60-138)
Dieldrin	***	0.12	0.12	101	(66-136)
Endrin	***	0.12	0.11	96	(63-142)
4,4'-DDD		0.12	0.12	99	(54-151)
Endosulfan II		0.12	0.11	95	(66-158)
4,4'-DDT	***	0.12	0.12	101	(62-142)
Endrin aldehyde		0.12	0.097	80	(45-161)
Endosulfan sulfate		0.12	0.13	105	(52-157)
Methoxychlor		0.12	0.12	100	(53-159)
Hexachlorobenzene		0.12	0.16	137	(40-160)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Dibutylchlorendate	128	(18-129)
Tetrachloro-m-xylene	97	(32-122)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
* Control parameters.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5248039
WORK ORDER: C0WVR
UNITS: ug/L

PREPARATION DATE: 9/05/95
DATE ANALYZED: 9/08/95

GC Semivolatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
2,4-D	***	4.0	2.0	49	(24-119)
2,4-DB		4.0	2.0	50	(40-160)
2,4,5-T		0.40	0.20	50	(40-160)
2,4,5-TP	***	0.40	0.25	61	(28-109)
Dalapon		10	6.2	62	(40-160)
Dicamba		0.40	0.21	52	(40-160)
Dichlorprop		4.0	2.2	55	(40-160)
Dinoseb		2.0	0.10	5.1 a	(40-160)
MCPA		400	164	41	(40-160)
MCPP		400	293	73	(40-160)
Pentachlorophenol		0.40	0.29	72	(60-140)
Picloram		4.0	2.6	66	(44-138)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
2,4-Dichlorophenylacetic acid	65	(40-160)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
*** Control parameters.
a Spiked analyte recovery outside control limits.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

AB #: B5H300111
C BATCH: 5244049
ORK ORDER: C0WD3
NITS: ug/L

PREPARATION DATE: 9/01/95
DATE ANALYZED: 9/07/95

- - - - - - - - - - - - - - - - - Mass Spec. Semivolatiles - - - - - - - - - - - - - - - - -

ARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
yridine		100	70	70	(12-147)
-Nitrosodimethylamine		100	77	77	(10-120)
henol	***	100	62	62	(10-113)
is(2-Chloroethyl) ether		100	86	86	(17-124)
-Chlorophenol	***	100	65	65	(17-108)
,3-Dichlorobenzene		100	67	67	(22-132)
,4-Dichlorobenzene	***	100	69	69	(24-133)
enzyl alcohol		100	82	82	(10-145)
,2-Dichlorobenzene		100	69	69	(21-127)
-Methylphenol		100	68	68	(12-119)
is(2-Chloroisopropyl) ether		100	78	78	(17-136)
-Methylphenol & her 4-Methylphenol		200	133	66	(10-135)
-Nitrosodi-n-propylamine	***	100	80	80	(12-139)
exachloroethane		100	64	64	(19-130)
itrobenzene		100	70	70	(22-127)
sophorone		100	81	81	(15-113)
-Nitrophenol		100	65	65	(18-114)
,4-Dimethylphenol		100	58	58	(10-108)
enzoic acid		100	53	53	(10-144)
is(2-Chloroethoxy)methane		100	77	77	(15-133)
,4-Dichlorophenol		100	65	65	(19-122)
,2,4-Trichlorobenzene	***	100	74	74	(27-119)
aphthalene		100	76	76	(30-121)
-Chloroaniline		100	79	79	(10-131)
exachlorobutadiene		100	72	72	(15-129)
-Chloro-3-methylphenol	***	100	68	68	(17-120)

URROGATE RECOVERY	%	ACCEPTABLE LIMITS
itrobenzene-d5	78	(26-131)
-Fluorobiphenyl	75	(27-119)
erphenyl-d14	79	(10-165)
-Fluorophenol	55	(10-116)
henol-d5	60	(10-175)
,4,6-Tribromophenol	62	(10-155)

TE:
ulations are performed before rounding to avoid round-off errors in calculated results.
Control parameters.

000043

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244049
WORK ORDER: C0WD3
UNITS: ug/L

PREPARATION DATE: 9/01/95
DATE ANALYZED: 9/07/95

Mass Spec. Semivolatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
2-Methylnaphthalene		100	80	80	(28-127)
Hexachlorocyclopentadiene		100	36	36	(10-94)
2,4,6-Trichlorophenol		100	64	64	(10-128)
2,4,5-Trichlorophenol		100	61	61	(10-130)
2-Chloronaphthalene		100	78	78	(24-126)
2-Nitroaniline		100	87	87	(15-133)
Dimethyl phthalate		100	86	86	(10-101)
Acenaphthylene		100	82	82	(18-134)
2,6-Dinitrotoluene		100	84	84	(15-134)
3-Nitroaniline		100	67	67	(17-132)
Acenaphthene	***	100	83	83	(24-127)
2,4-Dinitrophenol		100	59	59	(10-164)
4-Nitrophenol	***	100	64	64	(10-138)
Dibenzofuran		100	83	83	(27-126)
2,4-Dinitrotoluene	***	100	83	83	(15-138)
Diethyl phthalate		100	84	84	(10-114)
4-Chlorophenyl phenyl ether		100	82	82	(29-124)
Fluorene		100	83	83	(24-133)
4-Nitroaniline		100	80	80	(19-141)
4,6-Dinitro-2-methylphenol		100	75	75	(10-151)
N-Nitrosodiphenylamine		100	101	101	(16-143)
4-Bromophenyl phenyl ether		100	80	80	(25-129)
Hexachlorobenzene		100	82	82	(25-127)
Pentachlorophenol	***	100	71	71	(10-145)
Phenanthrene		100	82	82	(28-132)
Anthracene		100	86	86	(24-136)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Nitrobenzene-d5	78	(26-131)
2-Fluorobiphenyl	75	(27-119)
Terphenyl-d14	79	(10-165)
2-Fluorophenol	55	(10-116)
Phenol-d5	60	(10-175)
2,4,6-Tribromophenol	62	(10-155)

NOTE:

Calculations are performed before rounding to avoid round-off errors in calculated results.

*** Control parameters.

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111
QC BATCH: 5244049
WORK ORDER: C0WD3
UNITS: ug/L

PREPARATION DATE: 9/01/95
DATE ANALYZED: 9/07/95

Mass Spec. Semivolatiles

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS
Di-n-butyl phthalate		100	83	83	(14-135)
Fluoranthene		100	86	86	(25-136)
Pyrene	***	100	82	82	(20-137)
Butyl benzyl phthalate		100	83	83	(11-130)
3,3'-Dichlorobenzidine		100	51	51	(10-166)
Benzo(a)anthracene		100	83	83	(23-135)
Chrysene		100	82	82	(26-123)
bis(2-Ethylhexyl) phthalate		100	85	85	(19-142)
Di-n-octyl phthalate		100	66	66	(10-146)
Benzo(b)fluoranthene		100	67	67	(13-141)
Benzo(k)fluoranthene		100	68	68	(25-121)
Benzo(a)pyrene		100	68	68	(24-125)
Indeno(1,2,3-cd)pyrene		100	68	68	(15-132)
Dibenzo(a,h)anthracene		100	66	66	(20-127)
Benzo(ghi)perylene		100	67	67	(16-129)

SURROGATE RECOVERY	%	ACCEPTABLE LIMITS
Nitrobenzene-d5	78	(26-131)
2-Fluorobiphenyl	75	(27-119)
Terphenyl-d14	79	(10-165)
2-Fluorophenol	55	(10-116)
Phenol-d5	60	(10-175)
2,4,6-Tribromophenol	62	(10-155)

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
* Control parameters.

000045

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT

LAB #: B5H300111

Metals

PARAMETER		TRUE SPIKE	MEASURED SPIKE	PERCENT RECOVERY	RECOVERY LIMITS	DATE PREP/ ANALYZED
BATCH:5243097 WORK ORDER: C0VX8 UNITS: mg/L						
Arsenic	***	1.0	1.0	103	(80-120)	9/01/95

NOTE:
Calculations are performed before rounding to avoid round-off errors in calculated results.
*** Control parameters.

000043

Quanterra Environmental Services, Tampa
Sample Shipper Evaluation and Receipt Form

Client: RUST Project Name/Number: EGLIN AFB 40124

Samples Received by: [signature] Date Received: 8.30.95
Signature

Sample Evaluation Form by: [signature]
Signature

Type of shipping containers samples received in:

Quanterra cooler: ✓ Client cooler: ____

Quanterra shipper ____ Box ____ Other ____

Any "NO" responses or discrepancies should be explained in the "Comments" section.

		Yes	No
1)	Were custody seals on shipping container(s) intact?	✓	
2)	Were custody papers properly included with samples?	✓	
3)	Were custody papers properly filled out (ink, signed, match labels)?	✓	
4)	Did all bottles arrive in good condition (unbroken)?	✓	
5)	Were all bottle labels complete (sample no., date, signed, analysis preservatives)?	✓	
6)	Were correct bottles used for the tests indicated?	✓	
7)	Were proper sample preservativion techniques indicated?	✓	
8)	Were samples received within adequate holding times?	✓	
9)	Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found, indicate in comment section)	✓	
10)	Were samples in direct contact with wet ice? NOTE TEMPERATURE BELOW	✓	
11)	Were samples accepted into the laboratory? (If "No", see comments)	✓	

Cooler # ____ Temp 5 C Cooler # ____ Temp. 4

Comments: ____

000047

304

RUST ENVIRONMENT & INFRASTRUCTURE

Chain Of Custody Record
Eglin Air Force Base
For U.S. Army Corps Of Engineers

RUST Project No. 55351.000

Custody No. 189

Site/AFID ACC 24 / EGLIN

Sampling Team: C. Tucker, A. Macbeth

Sample ID	Date	Time	SACODE	SMCODE	MATRIX: GROUNDWATER (WG)	MATRIX: SURFACE WATER (WS)	MATRIX: SOILS (SO)	MATRIX: SEDIMENT (SE)	MATRIX: OTHER (SPECIFY CODE)	# Of Containers	SAMPLE ANALYSIS (X): TCL VOCs*	TCL SVOCs*	TCL Pesticides/PCBs*	TCL Pesticides Only*	TCL PCBs Only*	TAL Inorganics*	PP Metals*	TPH Gasoline (8015-m)	TPH - Diesel (8015-m)	4 Pkg Herbicides	Arsenic Cyanides	Malathion	COMMENTS	FIELD LOT CONTROL NUMBER: Ambient Condition Blank	Ambient Condition Blank	Equipment Blank	Trip Blank	Cooler Liner
24-MW-02	8/29	1300	N1	B	X					13	3	4	2	0	0	0	0	0	0	2	0	2		0	0	0	1	A
24-MW-02-C	8/29	1300	N1	B	X					3	3	0	0	0	0	0	0	0	0	0	0	0		0	0	0	1	A
24-MW-02	8/29	1300	N1	B	X					1	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	1	A
																							CUSTODY SEAL NO					
																							031784					
																							031781					
Temp Blank										1														0	0	0	1	A

Custody Transfers Prior to Receipt By Lab

	Relinquished by/(Signed) (Organization)	Received by/(Signed) (Organization)	Date	Time
1.	[signature]		8/29/95	1600
2.				
3.				

Sample Delivery Details/Laboratory Receipt

Delivered Directly to Lab ☐ Shipped ☒

Method of Shipment: Fed - Ex Airbill #: 5379746632

Analytical Lab: Quanta Location: Tampa, FL.

Lab Recipient: [signature] (Signature) Date: 8-30-95 Time: 1000

Additional Remarks: (Condition Upon Lab Receipt, Etc.)

Rev. 9/92

* Refer to current version of Eglin AFB Basewide Quality Assurance Program Plan for specific methods and lists of compounds.

RUST ENVIRONMENT & INFRASTRUCTURE

Chain Of Custody Record
Eglin Air Force Base
For U.S. Army Corps Of Engineers

RUST Project No. 51551.00

Custody No. 189

Site/AFID AOC 24 / EGLIN

Sampling Team: C. Tucker, A. Macbeth

Sample ID	Date	Time	SMCODE	SMCODE	MATRIX: GRO/GROWATER (WO)	MATRIX: SURFACE WATER (WW)	MATRIX: SOILS (SO)	MATRIX: SEDIMENT (SE)	MATRIX: OTHER (SPECIFY CODE)	# Of Containers	SAMPLE ANALYSIS (#): TCL VOCs*	TCL SVOCs*	TCL Pesticides/PCBs*	TCL Pesticides Only*	TCL PCBs Only*	TAL Inorganics*	PP Metals*	TPH Gasoline (8015-m)	TPH - Diesel (8015-m)	Herbicide	Hexavalent Chromium (Cr6)	Malathion	COMMENTS	FIELD LOT CONTROL NUMBER: Ambient Condition Blank	Ambient Condition Blank	Equipment Blank	Trip Blank	Cooler Liner
24-MW-01	8/29	1430	NI	B						4	0	0	0	0	0	0	0	0	0	2	0	2		0	0	0	0	C
24-MW-01	8/29	1530	NI	B						1	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	0	C
24-MW-03	8/29	1520	NI	B						4	0	0	0	0	0	0	0	0	0	2	0	2		0	0	0	0	C
24-MW-03	8/29	1618	NI	B						1	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	0	C
																							Custody Seal No.					
																							031700 031746					
TEMP BLANK										1														0	0	0	0	C

Custody Transfers Prior to Receipt By Lab

Relinquished by/(Signed) (Organization)	Received by/(Signed) (Organization)	Date	Time

Sample Delivery Details/Laboratory Receipt

Delivered Directly to Lab ☐ Shipped ☒

Method of Shipment: Fed Ex Airbill #: 537974672-4

Analytical Lab: Quanterra Location: Tampa, FL.

Lab Recipient: _____ (Signature) Date: 8.30.99 Time: 1000

Additional Remarks:
(Condition Upon Lab Receipt, Etc.)

Rev. 9/97

* Refer to current version of Eglin AFB Basewide Quality Assurance Program Plan for specific methods and lists of compounds.

Chain of Cus/US Corps

Quanterra Incorporated
4955 Yarrow Street
Arvada, Colorado 80002

303 421-6611 Telephone
303 431-7171 Fax

Quanterra
Environmental Services

ANALYTICAL RESULTS

FOR

QUANTERRA ENVIRONMENTAL SERVICES, TAMPA

Denver No. 044315

September 13, 1995

Reviewed by:

Daniel Rebarchik

Kevin McHugh

Quanterra Environmental Services

I. OVERVIEW

On August 31, 1995, Quanterra Environmental Services, Denver laboratory received one aqueous sample from Quanterra Environmental Services, Tampa.

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

I. Overview
II. Sample Description Information/Analytical Test Requests
III. Analytical Results
IV. Quality Control Report
    A. Standard Quanterra QC

Polynuclear Aromatic Hydrocarbons, HPLC

Standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory QC samples analyzed in conjunction with the samples in this project were within established control limits.

II. SAMPLE DESCRIPTION INFORMATION/ANALYTICAL TEST REQUESTS

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Quanterra's Denver laboratory is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Quanterra, Tampa

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
044315-0001-SA	24-MW-02	GRND-H2O	29 AUG 95	13:00	31 AUG 95

Quanterra
Environmental Services

ANALYTICAL TEST REQUESTS
for
Quanterra, Tampa

Lab ID: 044315	Group Code	Analysis Description	Custom Test?
0001	A	Polynuclear Aromatic Hydrocarbons, HPLC	N
		Prep - Polynuclear Aromatic Hydrocarbons by HPLC	N

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Services

III. ANALYTICAL RESULTS

The analytical results for this project are presented in the following data tables. The results are presented by sample, by test, with tests reported in the following order: GC/MS, Chromatography, Metals and Inorganics.

Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin. The date prepared is typically the date an extraction or digestion was initiated. For volatile organic compounds in water, the date prepared is the date the screening of the sample was performed.

Data sheets contain a listing of the parameters measured in each test, the analytical results and Quanterra's Denver laboratory reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on a "dry weight" basis, i.e. correction is made for moisture content.

In addition, surrogate recovery data is presented for all GC/MS analyses. The surrogate recovery is an indication of the effect of the sample matrix on the performance of the method. The results from Quanterra's Denver Laboratory Standard QA/QC Program, which generates data which are independent of matrix effects, are given in Section IV.

Quanterra
Environmental Services

Polynuclear Aromatic Hydrocarbons, HPLC

Method 8310

Client Name: Quanterra, Tampa
Client ID: 24-MW-02 (0.00,0.00)
Lab ID: 044315-0001-SA
Matrix: GRND-H2O Sampled: 29 AUG 95 Received: 31 AUG 95
Authorized: 31 AUG 95 Prepared: 05 SEP 95 Analyzed: 07 SEP 95

Parameter	Result	Units	Reporting Limit
Naphthalene	ND	ug/L	1.0
Benzo(a)anthracene	ND	ug/L	0.10
Chrysene	ND	ug/L	0.20
Benzo(b)fluoranthene	ND	ug/L	0.20
Benzo(k)fluoranthene	ND	ug/L	0.20
Benzo(a)pyrene	ND	ug/L	0.20
Dibenz(a,h)anthracene	ND	ug/L	0.30
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.40

Surrogate	Recovery	
Terphenyl-d14	48	%

ND = Not detected
NA = Not applicable

Reported By: Blake Besser Approved By: Roxanne Sullivan

IV. QUALITY CONTROL REPORT

The Quanterra laboratories operate under a rigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

A. Quanterra's Denver Laboratory Standard QC

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Quanterra's Denver laboratory QC program is based upon monitoring the accuracy of an analytical method by analyzing a Laboratory Control Sample (LCS) at frequent, well-defined intervals. Each LCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the LCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g., metals or conventional analyses) the LCS serves as the control sample. The recovery of the SCS is charted in exactly the same manner as described for the DCS, and provides a daily check on the performance of the method.

Accuracy for LCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, LCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

Quanterra
Environmental
Services

LOT ASSIGNMENT REPORT
nivolatile Organics by GC

boratory mple Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
4315-0001-SA	WATER	8310-EG-A	05 SEP 95-A1	05 SEP 95-A1

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Semivolatile Organics by GC

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) LCS	Accuracy(%) Limits
Category: 8310-EG-A				
Matrix: WATER				
QC Lot: 05 SEP 95-A1 QC Run: 05 SEP 95-A1				
Concentration Units: ug/L				
Benzo(a)anthracene	4.00	3.45	86	12-135
Benzo(a)pyrene	4.00	3.10	78	10-128
Benzo(b)fluoranthene	4.00	3.35	84	10-150
Benzo(k)fluoranthene	4.00	3.21	80	10-159
Chrysene	4.00	3.52	88	10-199
Dibenz(a,h)anthracene	4.00	2.37	59	10-110
Indeno(1,2,3-cd)pyrene	4.00	2.62	66	10-116
Naphthalene	4.00	3.21	80	10-122
Terphenyl-d14	20.0	16.2	81	31-157

Calculations are performed before rounding to avoid round-off errors in calculated results.

000083

Quanterra
Environmental
Services

'GLE CONTROL SAMPLE REPORT
'ivolatile Organics by GC

ılyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
:egory: 8310-EG-A				
:rix: WATER				
Lot: 05 SEP 95-A1 QC Run: 05 SEP 95-A1				
ıcentration Units: ug/L				
·phenyl-d14	20.0	14.4	72	31-157

lculations are performed before rounding to avoid round-off errors in calculated results.

000061

Quanterra
Environmental Services

METHOD BLANK REPORT
Nonvolatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 8310-HPLC-EGAFB-A			
Matrix: GRND-H2O			
QC Lot: 05 SEP 95-A1 QC Run: 05 SEP 95-A1			
Naphthalene	ND	ug/L	1.0
Benzo(a)anthracene	ND	ug/L	0.10
Chrysene	ND	ug/L	0.20
Benzo(b)fluoranthene	ND	ug/L	0.20
Benzo(k)fluoranthene	ND	ug/L	0.20
Benzo(a)pyrene	ND	ug/L	0.20
Dibenz(a,h)anthracene	ND	ug/L	0.30
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.40

RUST ENVIRONMENT & INFRASTRUCTURE

Chain Of Custody Record
Eglin Air Force Base
For U.S. Army Corps Of Engineers

RUST Project No. 55351.000

Custody No. 189

Site/AFID# AFC 24 / EGLIN

Sampling Team: C. Tucker, A. Macbeth

Sample ID	Date	Time	S/GCODE	S/GCODE	MATRIX: GROUNDWATER (WG)	MATRIX: SURFACE WATER (WS)	MATRIX: SOILS (SO)	MATRIX: SEDIMENT (SE)	MATRIX: OTHER (SPECIFY CODE)	# Of Containers	SAMPLE ANALYSIS (X): TCL VOCs*	TCL SVOCs*	TCL Pesticides/PCBs*	TCL Pesticides Only*	TCL PCBs Only*	TAL Inorganics*	PP Metals*	TPH Gasoline (8015-m)	TPH - Diesel (8015-m)	1 Pig/Jam Herbicide	Arsenic Cyanide	Malathion	COMMENTS	FIELD LOT CONTROL NUMBER: Ambient Condition Blank	Ambient Condition Blank	Equipment Blank	Trip Blank	Cooler Liner
24-MW-02	8/29	1300	N1	B	X					13	3	4	2	0	0	0	0	0	0	2	0	2	-01	0	0	0	1	A
24-MW-02-C	8/29	1300	N1	B	X					3	5	0	0	0	0	0	0	0	0	0	0	0		0	0	0	1	A
24-MW-02	8/29	1300	N1	B	X					1	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	1	A
																							CUSTODY SEAL NO					
																							031784					
																							031781					
Temp Blank										1														0	0	0	1	A

Custody Transfers Prior to Receipt By Lab

	Relinquished by/(Signed) (Organization)	Received by/(Signed) (Organization)	Date	Time
1.	[signature]		8/29/95	1600
2.		[signature]	8/31/95	930
3.				

Sample Delivery Details/Laboratory Receipt

Delivered Directly to Lab ☐ Shipped ☒

Method of Shipment: Fed - Ex Airbill #: 5379746632

Analytical Lab: Quanta Location: Tampa, FL.

Lab Recipient: [signature] (Signature) Date: 8-30-95 Time: 1000

Additional Remarks: (Condition Upon Lab Receipt, Etc.)

Rev. 9/92

* Refer to current version of Eglin AFB Basewide Quality Assurance Program Plan for specific methods and lists of compounds.

Chain of Cus/US Corps.

RUST ENVIRONMENT & INFRASTRUCTURE

Chain Of Custody Record
Eglin Air Force Base
For U.S. Army Corps Of Engineers

RUST Project No. 51551.00

Custody No. 189

Site/AFID AOC 24 / EGLIN

Sampling Team: C Tucker, A Mitchell

Sample ID	Date	Time	SUCODE	SUCODE	MATRIX: GRO/GROUNDWATER (WG)	SURFACE WATER (WS)	SOILS (SO)	SEDIMENT (SE)	OTHER (SPECIFY CODE)	# Of Containers	SAMPLE ANALYSIS (#): TCL VOCs*	TCL SVOCs*	TCL Pesticides/PCBs*	TCL Pesticides Only*	TCL PCBs Only*	TAL Inorganics*	PP Metals*	TPH Gasoline (8015-m)	TPH - Diesel (8015-m)	Herbicide	Hexane Extractables	Malathion	COMMENTS	FIELD LOT CONTROL NUMBER: Ambient Condition Blank	Ambient Condition Blank	Equipment Blank	Trip Blank	Cooler Liner
24-MW-01	8/29	1430	MI	B						4	0	0	0	0	0	0	0	0	0	2	0	2		0	0	0	0	0
24-MW-01	8/29	1530	MI	B						1	0	0	0	0	0	0	0	0	0	2	1	0		0	0	0	0	0
24-MW-03	8/29	1520	MI	B						4	0	0	0	0	0	0	0	0	0	2	0	2		0	0	0	0	0
24-MW-03	8/29	1618	MI	B						1	0	0	0	0	0	0	0	0	0	0	1	0		0	0	0	0	0
																							Custody Seal No. 031700 031746					
TEMP BLANK										1														0	0	0	0	0

Custody Transfers Prior to Receipt By Lab

	Relinquished by/(Signed) (Organization)	Received by/(Signed) (Organization)	Date	Time
1.				
2.				

Sample Delivery Details/Laboratory Receipt

Delivered Directly to Lab ☐ Shipped ☒

Method of Shipment: Fed Ex Airbill #: 537974672 4

Analytical Lab: Quanterra Location: Tampa, FL.

Lab Recipient: _____ (Signature) Date: 8.30.99 Time: 1000

Additional Remarks: (Condition Upon Lab Receipt, Etc.)

Rev. 9/92

* Refer to current version of Eglin AFB Basewide Quality Assurance Program Plan for specific methods and lists of compounds

Environmental Services

Quantera Incorporated
5910 Breckenridge Parkway, Suite H
Tampa, Florida 33610

813 621-0784 Telephone
813 623-6021 Fax

TO: QUANTERRA - DENVER

44315

FLORIDA TRACKING NUMBER	CLIENT SAMPLE ID	DATE SAMPLED	(FAX) ANALYTICAL DUE DATE	(HARD COPY) REPORT DUE DATE	NUMBER OF CONTAINERS	PARAMETERS
BSH300111 -001		8.29.95		9.14.95	2 LTRS	8270 PAH -01

ADDITIONAL COMMENTS:	RELINQUISHED BY/COMPANY	ACCEPTED BY/COMPANY	DATE	TIME
60006				
1 DRUM + EXPANDED		FED-X	8.30.95	1600
DELIVERABLES REQUIRED			8-31-95	930
PROBLEMS CONTACT:				
JEFF GRAHAM				

S:\WP51\FORMS\SAMPLEREV\FORM1

COOLER RECEIPT FORM

MS # 44315 COOLER # 1 # OF COOLERS 1 - CONTRACTOR COOLER ____

PROJECT EGLIN DATE RECEIVED 8-31-95

USE OTHER SIDE OF THIS FORM TO NOTE DETAILS CONCERNING CHECK-IN PROBLEMS

A. PRELIMINARY EXAMINATION PHASE: Date cooler opened 8-31-95 C of C # ____
by (print) J DeChant (sign) [signature]

1. Did cooler come with a shipping slip (airbill, etc.)?.....(yes) no
If yes, enter carrier name and airbill number here: ____

2. Were custody seals on the outside of the cooler?.....(yes) no
How many and where: ____ seal date: ____ seal name: ____

3. Were custody seals unbroken and intact at the date and time of arrival?..(yes) no

4. Did you screen samples for radioactivity using the Geiger Counter?.....(yes) no

5. Were custody papers sealed in a plastic bag & taped inside the lid?.....(yes) no

6. Were custody papers filled out properly (ink,signed,etc.)?.....(yes) no

7. Did you sign custody papers in the appropriate place?.....(yes) no

8. Was project identifiable from the custody papers?.....(yes) no
(If yes, enter the project name at the top of this paper)

9. If required, was enough ice used?.....(yes) no Type of ice? Wet
Temp 4.0 °C ____ °C ____ °C ____ °C

10. Designated person's initials here to acknowledge receipt of cooler JD
Date 8-31-95

****

B. LOG-IN PHASE: Date samples were logged in 8-31-95
by (print) J DeChant (sign) [signature]

11. Describe type of packing in cooler: ____

12. Were all bottles sealed in separate plastic bags?.....(yes) no

13. Did all bottles arrive unbroken and were the labels in good condition?...(yes) no

14. Were all bottle labels complete (ID,date,time,signed, preservative,etc)?.(yes) no

15. Did all bottle labels agree with custody papers?.....(yes) no

16. Were correct containers used for the test indicated?.....(yes) no

17. Were correct preservatives added to the samples?.....(yes) no

18. Was a sufficient amount of samples sent for tests indicated?.....(yes) no

19. Were bubbles absent in volatile samples? If no, list by sample number....(yes) no

---

20. Was the Project Manager called and the status discussed?.....(yes) no
(If yes, please give details on the back of this form)

000063

ımple Checklist

Quanterra Environmental Services

ɔject #: 44315 Date/Time Received: 8-31-95 930

ɔmpany Name & Sampling Site: EGLIN

*Cooler #(s): _____ _____ _____ _____ _____ _____ _____ _____

Temperatures: 4.0 _____ _____ _____ _____ _____ _____ _____

*Place copy of airbill inside all non-QUANTERRA coolers. Describe here.

ɲpacking & Labeling Check Points:

Yes	No		Initials
☑	☐	1. Radiation checked, record if reading > 0.5 mR/hr. (_____mR/hr)	TD
☑	☐	2. Cooler seals intact.	
☑	☐	3. Chain of custody present.	
☐	☑	4. Bottles broken and/or are leaking, comment if yes.	
		PHOTOGRAPH BROKEN BOTTLES	
☑	☐	5. Containers labeled, comment if no.	
☑	☐	6. pH of all samples checked and meet requirements, note exceptions.	
☑	☐	7. Chain of custody includes "received by" and "relinquished" by signatures, dates, and times	
☑	☐	8. Chain of custody agrees with bottle count, comment if no.	
☑	☐	9. Chain of custody agrees with labels, comment if no.	
☐	☐	10. VOA samples filled completely, comment if no.	
☐	☐	11. Are VOA bottles preserved, check for labels (N/A)	
☐	☐	12. Sediment present in "D," dissolved, bottles.	
☐	☑	13. Are analyses with short holding times requested.	
☐	☑	14. Is extra sample volume provided for MS, MSD or matrix duplicates.	
☐	☑	15. Multiphase samples present, comment is yes.	
		PHOTOGRAPH MULTIPHASE SAMPLES	
☑	☐	16. Clear picture taken, labeled, and stapled to project folder.	✓

ɔmments: Include action taken to resolve discrepancies/problems. Include a hard copy of e-mail or use extra ɹper if more space is needed. _____

Initials: _____

RUST ENVIRONMENT & INFRASTRUCTURE

FIELD DATA INFORMATION LOG FOR GROUNDWATER SAMPLING

Date (yr/mo/day): 95/08/29
Field Personnel: C. Tucker, A. Macbeth
Site Name: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
RUST Environment & Infrastructure Job #: 55551.000
Well ID #: 24-MW-03
☐ Upgradient ☒ Downgradient ☐ Sidegradient
Weather Conditions: Hot, Sunny, Windy
Air Temperature: 95 °F
Total Well Depth (TWD) From Top Of Well Casing = 28.69 1/100 ft
Depth to Ground Water (DGW) From Top Of Well Casing = 19.90 1/100 ft
Length of Water Column (LWC) = TWD - DGW = 8.79 1/100 ft
1 Casing Volume (OCV) = LWC x 0.17 = 1.5 gal
Minimum 3 Casing Volumes = 4.5 gal = Standard Evacuation Volume
Method of Well Evacuation: Disposable Bailer
Method of Sample Collection: Disposable Teflon Bailer
Total Volume of Water Removed: 6 gal

Casing Diameter: 2.0 inches
Casing Material: Sch. 40 PVC
Measuring Point Elevation: 86.64 1/100 ft
Height of Riser (above land surface): 2.74 1/100 ft
Land Surface Elevation: 83.90 1/100 ft
Screened Interval: 16.00 — 25.40 1/100 ft
Dedicated Pump or Bailer: ☐ Yes ☒ No ☐ Type
Protective Casing Around Well: ☒ Yes ☐ No ☐ Flushmounted
Locking Cap: ☒ Yes ☐ No
Protective Post/Abutment: ☒ Yes ☐ No
Well Integrity Satisfactory: ☒ Yes ☐ No
Well Yield: ☐ Low ☐ Moderate ☐ High
Comments/Observations
1618: Collected TAL Inorganics and Cyanide Samples
Sample Preservative checked - Okay.

FIELD ANALYSES

VOLUME PURGED (gallons)	0	2	4	6						
TIME (military)	1457	1501	1505	1510						
pH (S.U.)	6.81	7.21	7.31	7.18						
Sp. Cond. (µS/cm)	922	194	181	178						
Water Temp. (°C)	22	22	22	22						
Turbidity (NTU)*	7.4	909	1099	1125						

* Nephelometric Turbidity Units

COMMENTS/OBSERVATIONS: Well Cap/Protective Casing Lid Replaced After Sampling
Padlock Replaced and Locked Sample collected at 1520

APPENDIX G
WATER LEVEL DATA SUMMARY LOGS

RUST ENVIRONMENT & INFRASTRUCTURE

WATER LEVEL DATA SUMMARY

PROJECT: EGLIN AFB SITE INVESTIGATION	JOB NUMBER 55551.000
LOCATION: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE	DATE 08/29/95
CLIENT: USACE - OMAHA DISTRIC T	MEASURED BY C. Tucker
SURVEY DATUM: NGVD	WEATHER (Previous 24 hours)
MEASURING DEVICE: Electronic Water Level Tape	

WELL NUMBER	TIME (Military)	MEASURING POINT		DEPTH TO WATER (FT)	ELEVATION OF WATER (FT)	COMMENTS
		Description	Elevation (FT)			
24-MW-01	1346	Top of Well Casing	90.48	21.81	68.67	
24-MW-02	1200	Top of Well Casing	101.08	9.52	91.56	
24-MW-03	1447	Top of Well Casing	86.64	19.90	66.74	

RUST ENVIRONMENT & INFRASTRUCTURE

WATER LEVEL DATA SUMMARY

PROJECT: EGLIN AFB SITE INVESTIGATION	JOB NUMBER 55551.000
LOCATION: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE	DATE 11/14/95
CLIENT: USACE - OMAHA DISTRICT	MEASURED BY J. Karrakorn
SURVEY DATUM: NGVD	WEATHER (Previous 24 hours) Sunny, moderate wind, 65 - 70° F
MEASURING DEVICE: Electronic Water Level Tape	

WELL NUMBER	TIME (Military)	MEASURING POINT		DEPTH TO WATER (FT)	ELEVATION OF WATER (FT)	COMMENTS
		Description	Elevation (FT)			
24-MW-01	0935	Top of Well Casing	90.48	21.18	69.30	
24-MW-02	0930	Top of Well Casing	101.08	8.75	92.33	
24-MW-03	0942	Top of Well Casing	86.64	19.85	66.79	

100-001-283

APPENDIX H
GROUNDWATER SAMPLING LOGS

RUST ENVIRONMENT & INFRASTRUCTURE

FIELD DATA INFORMATION LOG FOR GROUNDWATER SAMPLING

Date (yr/mo/day): 95/08/29
Field Personnel: C. Tucker
Site Name: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
RUST Environment & Infrastructure Job #: 55551.000
Well ID #: 24-MW-01
☐ Upgradient ☒ Downgradient ☐ Sidegradient
Weather Conditions: Hot, Sunny, Windy
Air Temperature: 95 °F
Total Well Depth (TWD) From Top Of Well Casing = 30.91 1/100 ft
Depth to Ground Water (DGW) From Top Of Well Casing = 21.81 1/100 ft
Length of Water Column (LWC) = TWD - DGW = 9.10 1/100 ft
1 Casing Volume (OCV) = LWC x 0.17 = 1.5 gal
Minimum 3 Casing Volumes = 4.6 gal = Standard Evacuation Volume
Method of Well Evacuation: Disposable Bailer
Method of Sample Collection: Disposable Teflon Bailer
Total Volume of Water Removed: 6 gal

Casing Diameter: 2.0 inches
Casing Material: Sch. 40 PVC
Measuring Point Elevation: 90.48 1/100 ft
Height of Riser (above land surface): 2.38 1/100 ft
Land Surface Elevation: 88.10 1/100 ft
Screened Interval: 18.47 — 27.68 1/100 ft
Dedicated Pump or Bailer: ☐ Yes ☒ No ☐ Type
Protective Casing Around Well: ☒ Yes ☐ No ☐ Flushmounted
Locking Cap: ☒ Yes ☐ No
Protective Post/Abutment: ☒ Yes ☐ No
Well Integrity Satisfactory: ☒ Yes ☐ No
Well Yield: ☐ Low ☐ Moderate ☒ High
Comments/Observations
1530: Collected TAL Inorganics and Cyanide Samples
Sample Preservative checked - Okay.

FIELD ANALYSES

VOLUME PURGED (gallons)	0	2	4	6						
TIME (military)	1355	1404	1411	1417						
pH (S.U.)	7.68	7.51	7.88	7.45						
Sp. Cond. (µS/cm)	1.34	1.76	1.79	1.78						
Water Temp. (°C)	23	23	22	23						
Turbidity (NTU)*	22.5	769	939	1049						

* Nephelometric Turbidity Units

COMMENTS/OBSERVATIONS: Well Cap/Protective Casing Lid Replaced After Sampling
Padlock Replaced and Locked Sample collected at 1430

RUST ENVIRONMENT & INFRASTRUCTURE

FIELD DATA INFORMATION LOG FOR GROUNDWATER SAMPLING

Date (yr/mo/day): 95/08/29
Field Personnel: C. Tucker
Site Name: AOC NO. 24 C-52A AERIAL OVERSPRAY SITE
RUST Environment & Infrastructure Job #: 55551.000
Well ID #: 24-MW-02
☒ Upgradient ☐ Downgradient ☐ Sidegradient
Weather Conditions: Hot, Sunny, Windy
Air Temperature: 95 °F
Total Well Depth (TWD) From Top Of Well Casing = 17.90 1/100 ft
Depth to Ground Water (DGW) From Top Of Well Casing = 9.52 1/100 ft
Length of Water Column (LWC) = TWD - DGW = 8.38 1/100 ft
1 Casing Volume (OCV) = LWC x 0.17 = 1.4 gal
Minimum 3 Casing Volumes = 4.3 gal = Standard Evacuation Volume
Method of Well Evacuation: Disposable Bailer
Method of Sample Collection: Disposable Teflon Bailer
Total Volume of Water Removed: 6 gal

Casing Diameter: 2.0 inches
Casing Material: Sch. 40 PVC
Measuring Point Elevation: 101.08 1/100 ft
Height of Riser (above land surface): -0.12 1/100 ft
Land Surface Elevation: 101.20 1/100 ft
Screened Interval: 8.00 — 17.80 1/100 ft
Dedicated Pump or Bailer: ☐ Yes ☒ No ☐ Type
Protective Casing Around Well: ☐ Yes ☐ No ☒ Flushmounted
Locking Cap: ☒ Yes ☐ No
Protective Post/Abutment: ☐ Yes ☒ No
Well Integrity Satisfactory: ☒ Yes ☐ No
Well Yield: ☐ Low ☒ Moderate ☐ High
Comments/Observations
1415: Collected TAL Inorganics and Cyanide Samples
Sample Preservative checked - Okay.

FIELD ANALYSES

VOLUME PURGED (gallons)	0	2	4	6						
TIME (military)	1211	1232	1238	1244						
pH (S.U.)	7.66	7.46	7.48	7.40						
Sp. Cond. (µS/cm)	151	152	146	146						
Water Temp. (°C)	23	23	22	22						
Turbidity (NTU)*	86	211	230	145						

* Nephelometric Turbidity Units

COMMENTS/OBSERVATIONS Well Cap/Protective Casing Lid Replaced After Sampling
Padlock Replaced and Locked Sample collected at 1300

RUST Rust Environment & Infrastructure Inc.

A Rust International Company
15 Brendan Way
Greenville, SC 29615
P.O. Box 24000
Greenville, SC 29616

Phone 864.234.3000
Fax 864.234.3069

June 24, 1999

Mr. Eugene J. Liu, P.E. **TERC-3-12-045**
U.S. Army Corps of Engineers - Omaha District
Attn: CENWO-ED-ED
2 Central Park Plaza (10 FLRS)
222 South 15th Street
Omaha, NE 68102

Subject: Site Investigation Closure Letter/Response to EPA Comments
Area of Concern No. 24 C-52A Aerial Overspray Site
DACW45-94-D-0002, Delivery Order No. 12
Eglin Air Force Base, Florida

Dear Mr. Liu:

On behalf of Eglin Air Force Base, Florida (Eglin), the following is the Site Investigation (SI) Closure Letter for Area of Concern (AOC) No. 24 C-52A Aerial Overspray Site. Eglin performed an SI at the site in 1995. The SI field activities included installing and collecting groundwater samples from three monitoring wells. These activities and the SI results are described in the *Site Investigation Report Area of Concern No. 24 C-52A Aerial Overspray Site* (REI, August 1996). Eglin recommended No Further Action (NFA) in this SI Report. In their review of this document, the Florida Department of Environmental Protection (FDEP) concurred with the NFA recommendation (Brown, February 1998). However, the U.S. Environmental Protection Agency (EPA) provided several comments to the SI Report that warranted addressing (Benedikt, 1997).

The status of the work performed at AOC No. 24 and responses to EPA's comments were presented to the Eglin Tier I Partnering Team on January 7, 1998 (Eglin, January 1998). A copy of the meeting minutes for this meeting is provided in Attachment 1. The Team consensed on the NFA recommendation and determined that Eglin should provide EPA with a formal response to comment letter. The SI Report and the Agencies' comments were again discussed on August 21, 1998 during a meeting in Atlanta, Georgia among representatives of FDEP, EPA, Eglin, and Rust Environment & Infrastructure, Inc. (REI). The meeting minutes for this meeting are presented in

REI (September 1998). This SI Closure Letter represents the formal response to comments that was discussed in these two meetings.

The objective of this letter is to provide sufficient information to satisfactorily resolve the comments. This should enable EPA to concur with the NFA recommendation for the site. The document includes a description of the site; a summary of the activities, results and conclusions of two SIs performed at the site; EPA's comments on the latter SI report (REI, 1996); and Eglin's response to the comments.

SITE LOCATION AND BACKGROUND

AOC No. 24 is located in Walton County, Florida, approximately 12 miles northeast of the city of Niceville in the southeastern part of Test Area C-52 (Figures 1 and 2). Specific directions to the site are provided in REI (August 1996).

The C-52A Aerial Overspray Site was initially identified in 1990 as a potential source of environmental contamination associated with aerial dissemination of herbicide orange. The site is part of an active bombing range and, as such, falls under the Military Munitions Rule (EPA, 1997). It is situated on a relatively flat, treeless tract of land approximately 165 acres in size, roughly bounded by Range Road (R.R.) 222 to the south and an abandoned east-west trending runway to the north (Figure 3). The spray area is characterized by sparse scrub vegetation interspersed with bare sandy areas. According to long-time Eglin Test Range employees, the overspray area was used to dispose of herbicides following scheduled test missions that were aborted over the C-52 Test Grid, which is located 0.5 miles south of the site. This primarily occurred when climatic conditions were not in accordance with test protocol. As a result, the aircraft would release their loads above the overspray area. The test missions at C-52 Test Grid was conducted during the 1960s and early 1970s, although records of the frequency of this practice and the quantity of herbicides released were not maintained.

SITE INVESTIGATIONS

Two SIs have been performed at the C-52A Aerial Overspray Site. Eglin performed the first SI in 1992. These activities and results are presented in the *Final Site Investigation Report for Herbicide Orange Sites* (ES, December 1993). The second SI was performed in 1995. As noted above, the

activities and results of this second SI are presented in REI (August 1996). These two SIs are described separately in the following paragraphs.

Site Investigation 1992

Past investigations at the C-52A Aerial Overspray site have included collection of sediment and biological samples from the headwaters and lower parts of Basin and Mullet Creeks. These samples were analyzed for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), a contaminant produced during manufacture of herbicides orange and purple. No 2,3,7,8-TCDD was detected in any of these samples above the laboratory detection limits. These samples "did not indicate contamination with 2,3,7,8-TCDD" (ES, December 1993). Similarly, the ES (December 1993) report stated that "Past analyses of biological specimens (e.g., fish and crayfish) from Mullet Creek have not shown signs of 2.3,7,8-TCDD bioaccumulation". These statements were supported by references to Rhodes (1985), Radian (1986), and Radian (1988). The results of this investigation indicated that further assessment of the stream sediments and biota was not necessary.

The objectives of the 1992 SI performed at the C-52A Aerial Overspray Site was to confirm the absence or presence of herbicide related constituents in surface soils at the site and to determine if additional investigation was warranted.

The scope of work for this SI included the following:

- Collection of thirty surface (zero to 0.5 feet below land surface [bls]) soil samples spaced approximately 250 feet (in the north-south orientation) and 165 feet (in the east-west orientation) apart within a grid pattern (Attachment 1), and
- Submittal of the soil samples to a laboratory for 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), and arsenic analyses.

A table summarizing the results of the soil laboratory analyses is presented in Attachment 2. This table has been photocopied directly from ES (December 1993). The complete laboratory reports are presented in that report as well. No 2,4-D and 2,4,5-T were detected in the 30 soil samples at concentrations above their respective detection limits (approximately 0.072 milligrams per kilogram (mg/Kg) and 0.026 mg/Kg). 2,3,7,8-TCDD was detected in one of the 30 samples (sample B4, located in the southeastern part of the grid) at 0.3025 micrograms per kilogram (µg/Kg). No Tier I or Tier II Screening Levels exist for 2,3,7,8-TCDD (Eglin, March 1998). Arsenic was detected in a different sample (sample C15, located in the northwestern part of the grid) at 3.3 mg/Kg.

The detected concentration exceeds arsenic's Tier IA and Tier II Screening Levels (0.43 mg/Kg and 1.66 mg/Kg), although it is below the Florida Soil Cleanup Goal (FSCG) for Industrial Soils (3.7 mg/Kg ; Eglin, January 1999).

ES (December 1993) also stated that, prior to the SI (presumably sometime in the middle 1980s), sediment and biological samples were collected from the headwater and lower parts of Basin Creek.

No surveyed coordinates are provided in ES (December 1993) for the locations of these soil and sediment/biological samples. The figure from the ES Report, which shows the soil sampling locations, is presented in Attachment 2.

The results of the 1992 investigation and the risk evaluation indicated that further assessment of soils in the C-52A Aerial Overspray Site was not necessary (ES, December 1993). ES (December 1993) also concluded, "although the contaminants were detected at low levels, further investigation or action is needed to determine if exposure via groundwater is possible".

Site Investigation 1995

Eglin felt that the 1992 SI soil sampling analytical results demonstrated that the presence of detected constituents (2,3,7,8-TCDD and arsenic) associated with AOC No. 24 were singular, isolated, and at low concentrations. However, they did feel that the groundwater quality at the site needed to be evaluated. Therefore, in 1995 REI performed a second SI at the site. The objectives of this SI were the following:

- Determine the presence or absence of environmental contamination in groundwater. If contaminants are present, evaluate the concentrations with respect to Applicable and Relevant or Appropriate Requirements (ARARs), and/or guidance concentrations and identify Contaminants of Potential Concern (COPCs).
- If COPCs are not identified, provide documentation to support No Further Action.
- If COPCs are present, provide sufficient data to design an effective strategy for the following actions: 1) interim removal actions (if appropriate); 2) further evaluation of the site consistent with RCRA and CERCLA; 3) evaluation and corrective actions through FDEP, Chapter 62-770 regulations for petroleum sites (if appropriate); and/or 4) support of no further action if the site does not pose a significant risk to human health or the environment.

The approach adopted to meet the SI objectives for AOC No. 24 included the following tasks:

- Installation of three groundwater monitoring wells to an approximate depth of 20 to 30 feet bls. The locations of these monitoring wells are shown on Figure 4.

- Collection and analyses of the groundwater samples from the monitoring wells. The laboratory analyses included Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-Volatile Organic Compounds (SVOCs), TCL Pesticides/Polychlorinated Biphenyls (PCBs), Target Analyte List (TAL) arsenic, herbicides, and/or malathion.

The results of the SI included the following:

- The site is underlain by poorly graded fine sands to approximately 30 feet bls. Locally, clayey sands were detected at about 27 feet bls.
- The depth to groundwater is approximately 6 to 19 feet bls. Groundwater occurs under water-table conditions. Groundwater elevations indicate the groundwater beneath the site flows eastward at a hydraulic gradient of 0.008 ft/ft toward Basin Creek (Figure 5). Geologic literature indicated that the depth to the underlying Pensacola Clay at the site is up to 50 feet bls. The shallow aquifer and the underlying Pensacola Clay are approximately 50 and 200 feet thick, respectively, in this area.
- No TCL VOCs, TCL SVOCs, TCL Pesticides/PCBs, malathion, TAL Arsenic, or herbicides were detected above Tier I Screening Levels in applicable groundwater samples sent to the laboratory for analyses. Therefore no COPCs were identified.

Based on the SI results, no further action was recommended for AOC No. 24 (REI, August 1996).

EPA'S COMMENTS AND EGLIN'S RESPONSES

The following are EPA's comments verbatim from Benedikt (July 1997) and Eglin's responses (in italics).

1. The primary objectives of the SI as stated in Section 1.1 of the Draft SI Report are to determine the presence or absence of environmental contamination. If contamination is present, then the concentrations will need to be evaluated with respect to applicable and relevant or appropriate requirements (ARARs) and/or guidance concentrations and contaminants of potential concern (COPCs) would need to be identified. Section 5.2 of the Draft SI Report recommends that no COPCs should be identified for AOC No. 24. However, because the Draft SI Report has failed to adequately address source sampling events and surface water pathway concerns there is not enough information to support the recommendation that no COPCs be identified. Section 2.3, Previous Investigations, notes, "Thirty soil samples (zero to six inches in depth) were collected,

using a grid pattern across the site." However, no analytical data was provided for these samples in the Draft SI Report. Please include tables, or a paragraph which adequately outlines the previous samples collected from the source area. The table or paragraph should include all relevant figures from the previous investigation. Also, data collected from these investigations should be compared to Tier I and Tier II screening criteria as described in Guidelines for COPC Identification at Eglin AFB" by REI.

In addition to lacking adequate soil sampling data, the test also includes little information about the surface water pathway. The Draft SI Report states on page 6, "Past investigations at the C-52A Aerial Overspray site have included collection of sediment and biota samples from Basin and Mullet Creeks, which drain the site. These samples were analyzed for 2,3,7,8-TCDD. No 2,3,7,8-TCDD was detected in any of these samples above the laboratory detection limits." This section does not provide the information as required by Section 6.4 of the "Guidance for Performing Site Inspections under CERCLA." Specifically, the text mentions neither if samples were collected in the area impacted by site operations, nor if sample results were compared to background. Furthermore, these samples were analyzed for only 2,3,7,8-TCDD, even though arsenic, and possibly other dioxin components, were detected in on-site surface soil samples. If the surface water and/or sediment samples do not fulfill the requirements of the guidance, further sampling may be necessary to support a recommendation of "No Further Action".

RESPONSE: The discussion on the 1992 SI above adequately addresses the first part of this comment. The text describes the soil sampling efforts and the results, as compared to applicable Tier IA, IB, II Screening Levels. Attachment 1 includes a figure from ES (1993) that shows that sample locations. Attachment 1 also contains a table from ES (1993) that summarizes the laboratory analytical results.

With regard to the second part of this comment, which addresses the surface water pathway, this addendum describes the lack of specific information available to Eglin at this time. We feel that additional sediment and/or biological sampling is unnecessary because the detections of arsenic and 2,3,7,8-TCDD were singular, isolated, and at low concentrations. Furthermore, the relatively level surface terrain and the distance between the site and Basin and Mullet Creeks suggest that any impact of the surface waters would occur from groundwater discharge, rather than from overland runoff. The groundwater quality data obtained during the 1995 SI show the groundwater to be unimpacted.

2. Section 3.1.2, Groundwater Sampling, states, "three groundwater samples were collected using new, disposable Teflon™ bailers". EPA, Region 4, Environmental Investigations Standard

Operating Procedures Quality Assurance Manual (EISOPQAM), May 1996, Section 7.2, page 7-4 discourages the use of bailers stating that "bailers tend to disturb any sediment that is present in the well, creating or increasing sample turbidity. If a bailer is used, it should be a closed-top Teflon™ bailer." Future sampling events should include the use of a low-flow peristaltic pump and a vacuum jug assembly for purging and collecting groundwater.

RESPONSE: This comment is noted. Since 1996, Eglin has adopted the low-flow method as the standard operating procedure for groundwater sampling from all monitoring wells at the base.

3. Data collected during the SI indicates that the constituents arsenic and dalapon were detected in several groundwater samples. The results, along with the appropriate data qualifier should be added to the "Tables" section, and a full discussion of these constituents should be presented in the "Summary of Results" section.

RESPONSE: The two following bullets address this comment:

- *Arsenic was detected in each of the monitoring wells at a concentration of 10 micrograms per liter (µg/L), well below the arsenic Tier I Screening Level of 50 µg/L (which represents the federal drinking water maximum contamination level (MCL)). Arsenic was detected in the laboratory preparation blank at concentrations less than five times those detected in the groundwater samples. Therefore, the reported values of arsenic were flagged with a "u", indicating that the results are considered nondetects.*
- *One herbicide, dalapon, was detected in monitoring wells 24-MW-02 and 24-MW-03 at concentrations of 2.0 µg/L and 2.2 µg/L, respectively, well below dalapon's Tier I Screening Level of 200 µg/L. However, these reported values were, like arsenic, flagged with a "u". Although dalapon was reported as nondetect in the herbicide method blank (with a reporting limit of 2.0 µg/L), the quantitation reports showed that the level of dalapon in the blank was essentially the same as those reported in the samples (2.0 versus a maximum of 2.2). Therefore, the reported result in 24-MW-02 was changed to the reporting limit and qualified U. The reported result in 24-MW-03 was qualified U.*

4. Table of Contents contains several formatting oversights that should be addressed.

RESPONSE: This comment is noted. However, as discussed in subsequent meetings with EPA and FDEP these changes do not warrant a resubmittal of the document (REI, September 1998).

SPECIFIC COMMENTS

The specific comments listed below are presented in order of their occurrence in the Draft SI and are organized by section, page, paragraph, and figure or table numbers, as appropriate.

1. Page iv, List of Acronyms: Review this list and remove all acronyms which are not used in the document text.

RESPONSE: This comment is noted. However, as discussed in subsequent meetings with EPA and FDEP these changes do not warrant a resubmittal of the document (REI, September 1998).

2. Page 13, Section 4.2 : Due to the proximity of the site to the water, it appears that Site No. 24 might be tidally influenced. Please address these concerns in this section.

RESPONSE: The site lies about 4 miles north of the shoreline of central Choctawhatchee Bay. This part of the Bay has a small tidal range. Therefore, as discussed in the January 1998 Partnering Meeting, tidal influences are not considered to be an issue at this site.

Eglin considers this letter to meet their commitment from the January 1998 Tier I Partnering Team Meeting (Eglin, January 1998) and the August 1998 meeting with EPA and FDEP (REI, September 1998). It should also be noted that AOC No. 24 is located on an active bombing range and will ultimately be managed under the Military Munitions Rule (EPA, 1997). Upon EPA concurrence, an SI Report completion letter approving the NFA recommendation is requested.

Rust Environment & Infrastructure, Inc. appreciates the opportunity to provide services to the U.S. Army Corps of Engineers and Eglin Air Force Base. If you have any questions or require further information, please call me at (850) 862-5191.

Sincerely,

Rust Environment & Infrastructure, Inc.

Richard L. Burdine, P.G.
Chief Project Manager

References
Distribution List
Figures
Attachment 1
Attachment 2

REFERENCES

Benedikt, Craig A., USEPA, Letter to John Krishack, *Subject: Site Investigation Report, AOC No. 24,* Eglin Air Force Base, Florida, July 9, 1997.

Brown, Gregory M., FDEP, Letter to John Krishack, *Subject: Site Investigation Report, AOC No. 24 C-52A Aerial Overspray Site,* Eglin Air Force Base, Florida, February 9, 1998.

Eglin Air Force Base, *Eglin Tier I Partnering Team Meeting Minutes,* January 1998.

Eglin Air Force Base, *Guidelines for COPC Identification at Eglin AFB*, March 1998.

Eglin Air Force Base, *Calculation of a Tier II Screening Level for Arsenic and Standard Operating Procedures for the Evaluation of Arsenic During Site Investigation Process at Eglin Air Force Base*, January 1999.

ES, *Final Site Investigation Report for Herbicide Orange Sites,* Eglin Air Force Base, December 1993.

Radian Corporation, Letter Report to USAF OEHL, Brooks AFB, *Subject: Dioxin Monitoring Sample Results for Eglin AFB, Florida*, 1986.

Radian Corporation, Letter Report to USAF OEHL, Brooks AFB, *Subject: Dioxin Monitoring Sample Results for Eglin AFB, Florida*, February 9, 1988.

Rhodes, A. N., *Herbicide Orange Monitoring Program Addendum 1*, Prepared for Engineering and Services Laboratory, Tyndall Air Force Base, Florida, ESL-TR-83-56, 1985.

REI, *Site Investigation Report, Area of Concern No. 24 C-52A Aerial Overspray Site,* Eglin Air Force Base, Florida, August 1996.

REI, Letter to Eugene J. Liu, *Meeting Minutes Area of Concern/Point of Interest Site Investigation Report Meeting, Atlanta, Georgia, August 21, 1998,* September 21, 1998.

U.S. Environmental Protective Agency, *Military Munitions Rule*, Federal Register, vol. 62, No. 29, 40 CFR Parts 260-266, and 270, February 12, 1997.

DISTRIBUTION LIST

TERC-3-12-045

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3.	Mr. Greg Brown FDEP 2600 Blair Stone Road Tallahassee, FL 32399-2400	1
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5.	Ms. Robin M. Bjorklund AAC/EMR 206 2nd Street, Building No. 216 Eglin AFB, FL 32542	3
6.	Earth Tech Fort Walton Beach	1
7.	Mr. Brett Wendel Earth Tech Environment & Infrastructure, Inc. 11 Racetrack Road NE Building A Fort Walton Beach, FL 32547	1 (cover letter only)

FIGURES

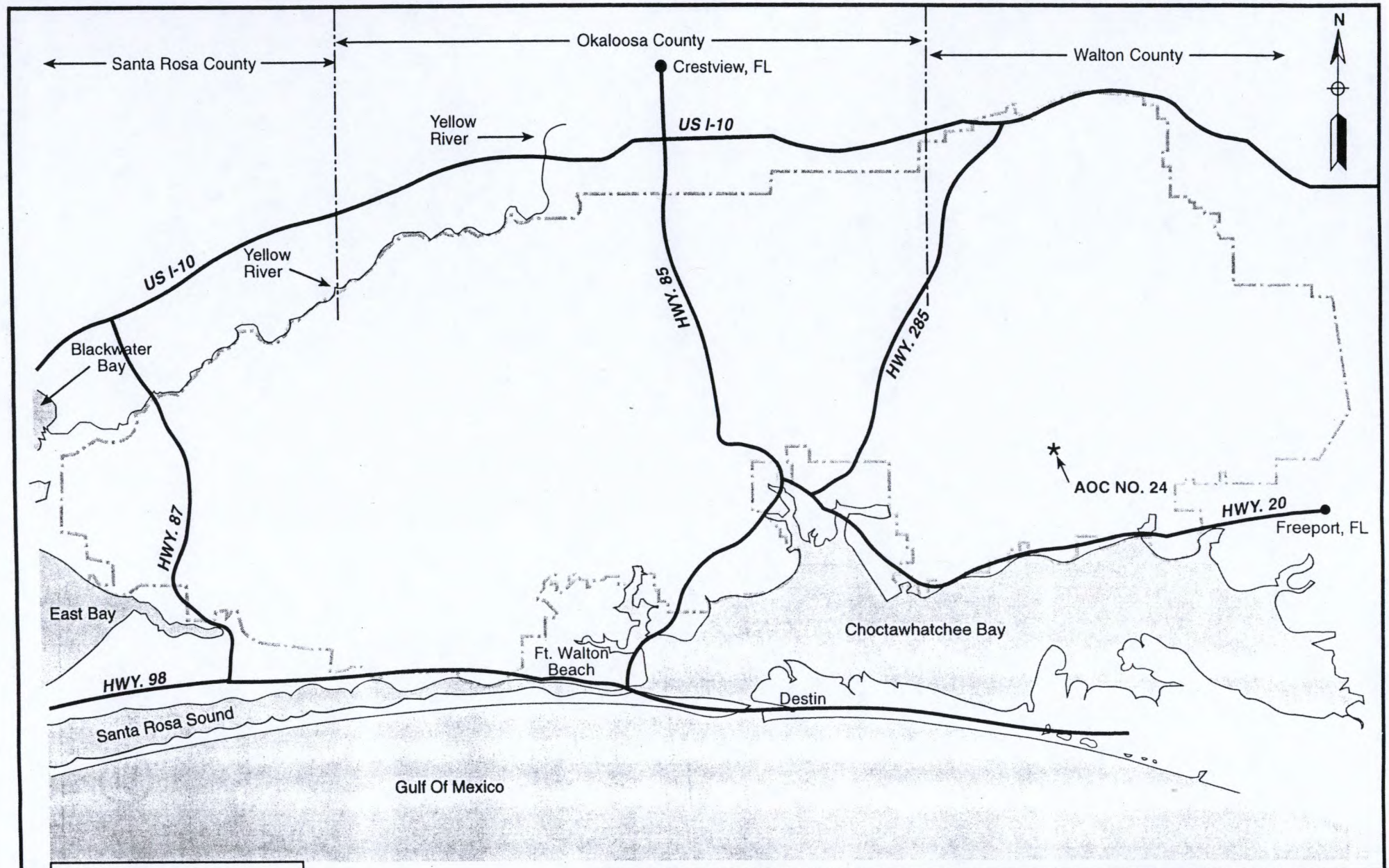
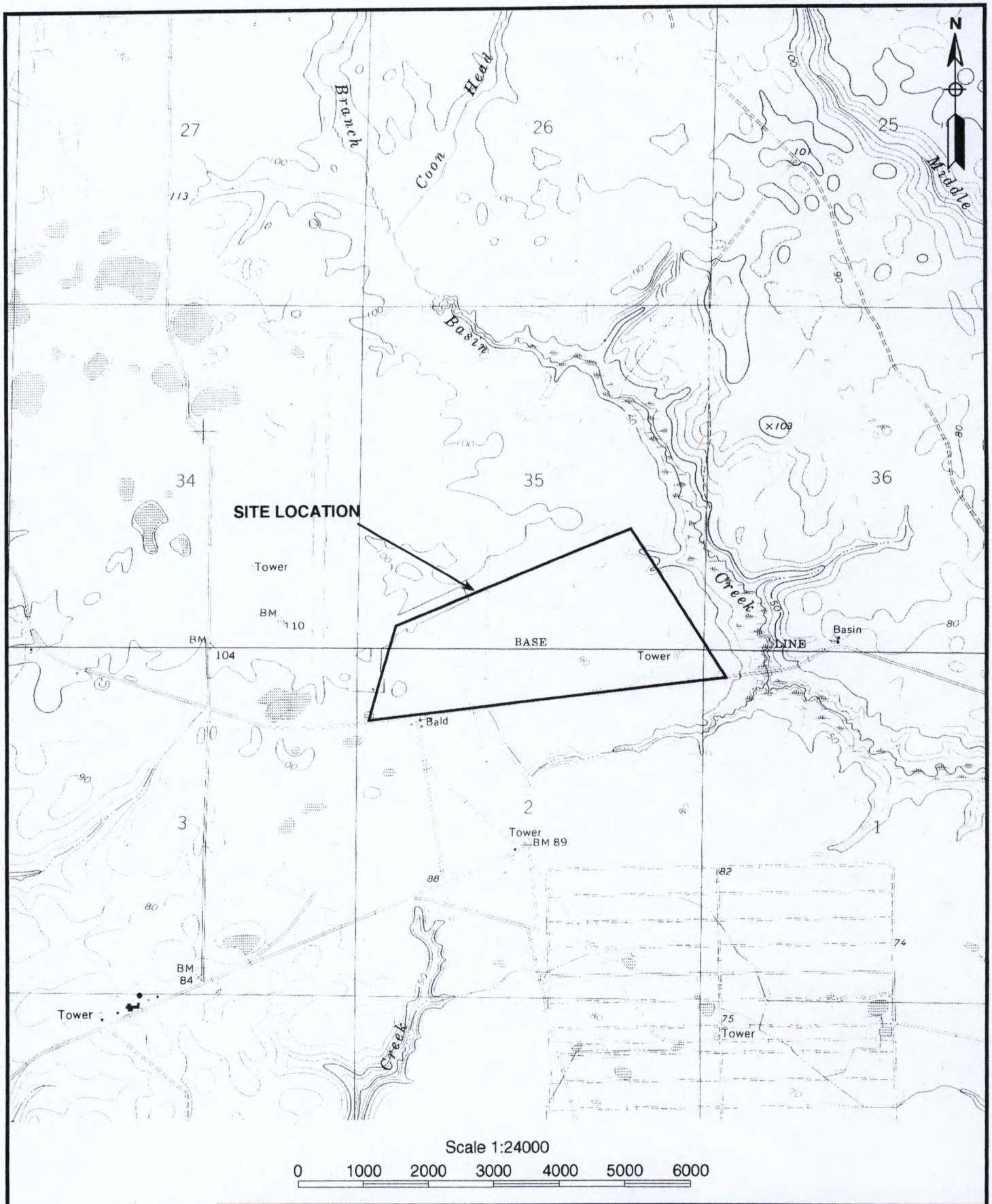


FIGURE 1
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
SITE LOCATION MAP

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

Optical D 1 / F_1 AOC NO 4 fh8



Ref.: U.S.G.S., 7.5 min Quadrangle
Niceville SE, FL. 1970, PR 1987.

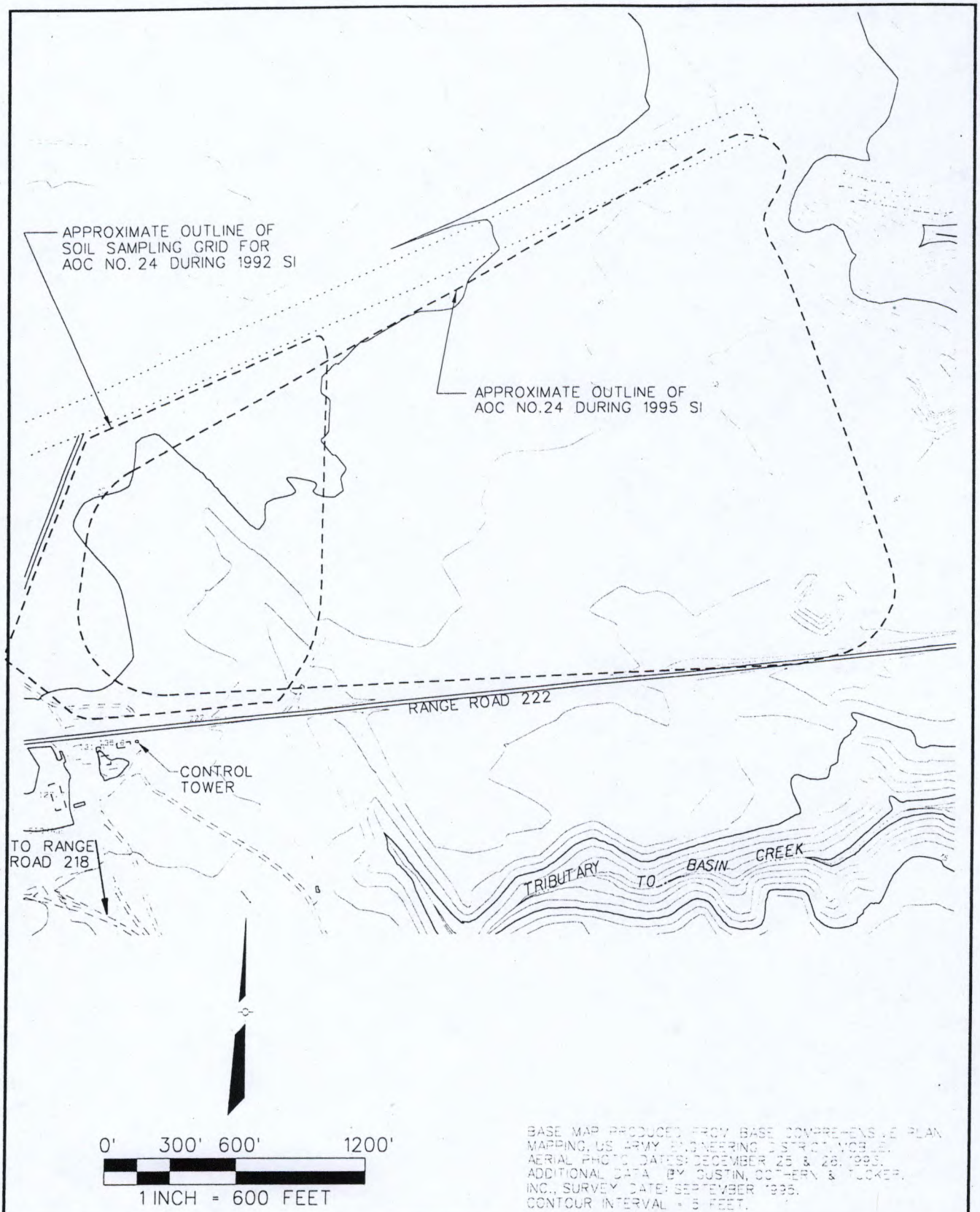
RUST

Rust Environment & Infrastructure

FIGURE 2
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
SITE AND VICINITY

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

Data/Graphics/55556/F_2AOCNO24.ai8



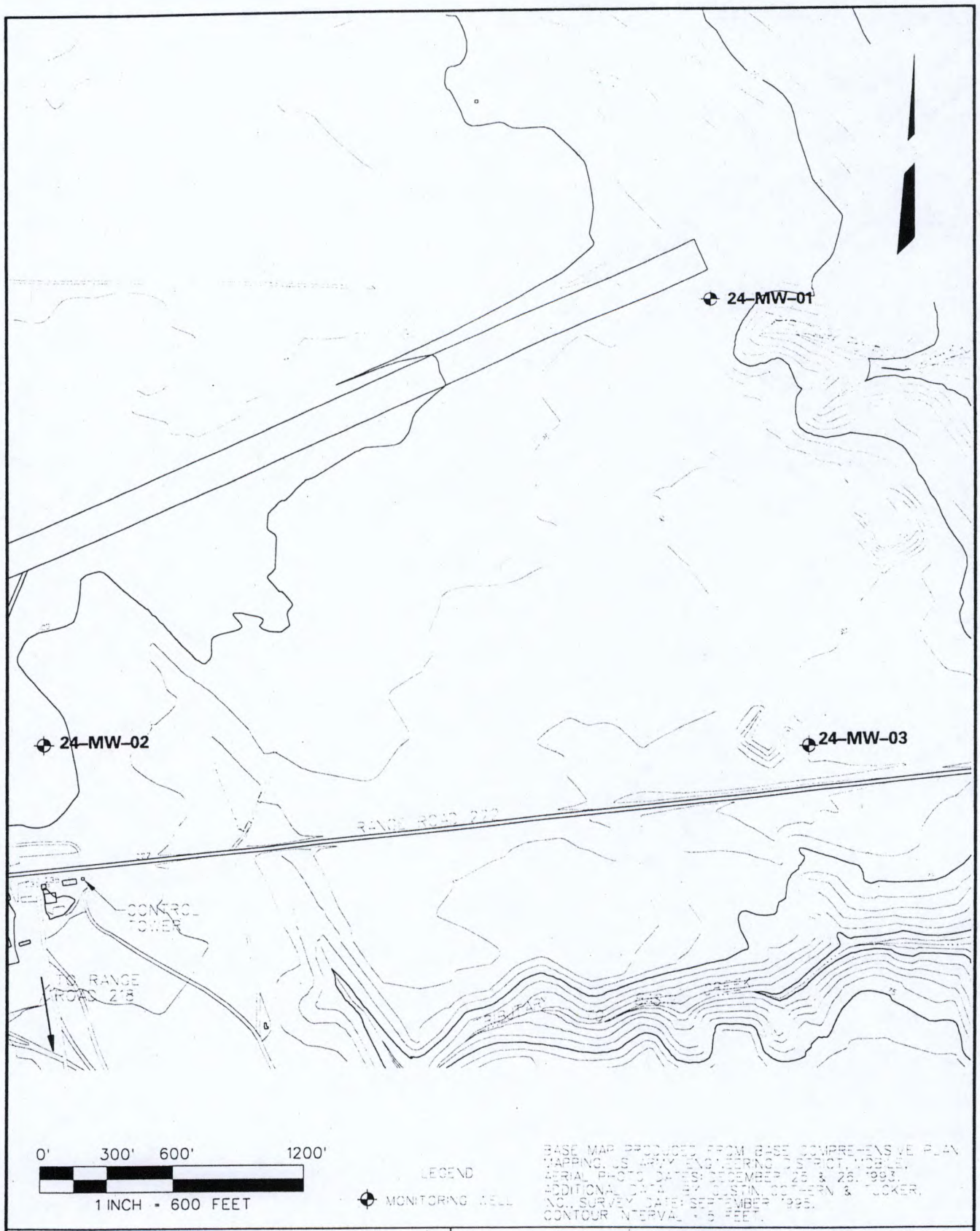
BASE MAP PRODUCED FROM BASE COMPREHENSIVE PLAN MAPPING, US ARMY ENGINEERING DISTRICT, MOBILE. AERIAL PHOTO DATES: DECEMBER 25 & 26, 1995. ADDITIONAL DATA BY GUSTIN, COTTEN & TUCKER, INC., SURVEY DATE: SEPTEMBER 1995. CONTOUR INTERVAL = 5 FEET.

EARTH TECH

FIGURE 3
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
SITE LAYOUT MAP

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

O:\EGLINGIS\CADD\D09\AOC243.DGN

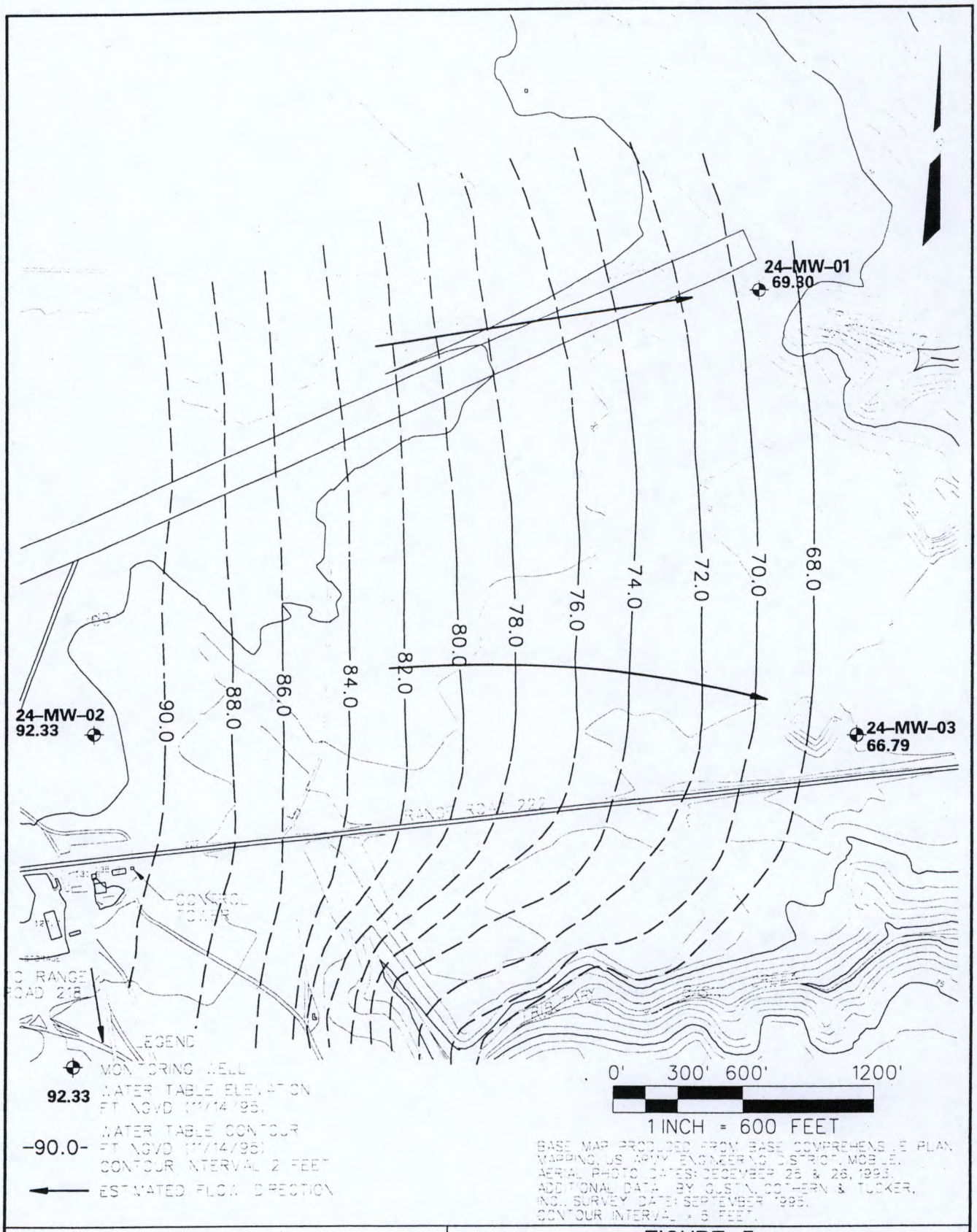


EARTH TECH

FIGURE 4
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
GROUNDWATER SAMPLING LOCATIONS

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

O:\EGLINGIS\CADD\D09\AOC244.DGN



EARTH TECH

FIGURE 5
AOC NO. 24
C-52A AERIAL OVERSPRAY SITE
WATER TABLE CONTOUR MAP

EGLIN AIR FORCE BASE, FLORIDA
PROJECT NO. 55551.000

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ATTACHMENT 1

DRAFT

Meeting Minutes: Eglin AFB Partnering Meeting

6-8 January 1998

FDEP Twin Towers, Tallahassee, Florida

Team Leader & Host:	Greg Brown
Team Scribe:	John Mitchell
Timekeeper:	Richard Burdine
Facilitator:	Elle Wolf-Muhleck
Tier II Link:	Robert Elliott

Partnering Team Members:

Ralph Armstrong	Eglin AFB
Robin Bjorklund	Eglin AFB
Greg Brown	FDEP
Richard Burdine	RUST
Rodney Arnold	AFCEE
Paul Seavy	OBG
Craig Overstreet	Eglin AFB
Robert Pope	EPA Region IV
Jim McClain	Eglin AFB
Steve Williams	Eglin AFB
Elle Wolf-Muhleck	Management Edge
Sylvia Parzentny	URS

Proxys: Patricia Williamson - absent (proxy to Steve Williams)

Guest: John Mitchell (Dynamac/EPA contractor)
John Swenfurth/(CH2M)
Eugene Liu/(ACOE)
Don Strickland/(BEA)
Jean Bosart/(CH2M)
Mike Doran/(RUST)
Alec McBeth/(RUST)

0830: WELCOME/CHECK IN

Elle introduced herself as the facilitator for two of the three days and Sylvia will facilitate the day 3 meeting.

Mike Filips is still out on his 90-day promotion and Eugene Liu will be standing in for him for the meeting.

Patricia Williamson is not in attendance for the meeting. However, John Swenfurth of CH2M is sitting in as a guest in her absence.

0850 Reading of the Ground Rules by the team members and guests.

Adjustments were made to the planned agenda to accommodate the needs of the presenters.

0940 Review of the October and November meeting minutes by the team included edits for the November meeting minutes. After the November meeting minutes are edited they will be considered final.

1000 Action Item review:

All open action items that are not completed will continue to be carried forward as action items.

Action Item No.	Responsible Team Member	Due Date	Action Item/Status
9711-A1	Eglin/EPA	Dec	Meet/tele-con to discuss Eglin CAMP dates in Dec. / Done
9711-A2	Team	Nov	Provide Richard with written comments on any changes in the Visitor information package that pertain to the roles and responsibilities of the Team members. This is a carry over from action item 9709-A11 and includes submittal to Tier I.
9711-A3	Richard	Jan 97	Verify Partnering team procedures on conflict resolution for the revised Visitor info package. Incorporate revisions to the information package from the Nov meeting. / Done
9711-A4	Steve/Sylvia	Dec/Jan	Obtain information on monitoring and irrigation wells associated with IRP sites at Duke field and surrounding area to assess the decreasing groundwater levels being observed in the area of ST-69. / to be incorporated in May RFI.
9711-A5	John	Nov	Obtain/use Hurlburt Field Meeting Minutes as a "go by" for the Nov Meeting Minutes. / Done
9711-A6	Team	Nov	Fax comments to Robin on the Oct. Meeting Minutes by Nov 20th. / Done
9711-A7	Jim	Jan	Consult with Jackson Guard on erosion control measures for LF-51. / Done
9711-A8	Richard	Dec	Provide a Partnering Team Meeting schedule that reflects the revised "3 dayer" every other month approach. / in the works.
9711-A9	Don	Jan	Provide Table of Contents from Cape Canaveral/Patrick AFB Decision Documents to the Team as references. / to be discussed this meeting - Done.

9711-A10	Paul	Jan	To send out Volume I of the Group II Generic Basewide Eco-Risk documents. / to be completed by January 23rd.
9711-A11	Richard/Elle	Dec/Jan	Contact Tier II link for Metrics information update. / Done.
9711-A12	Paul/Elle	Dec/Jan	Contact Tier II link for feedback on the Tier I and II Workshop as well as the idea of the "Roundtable discussion approach". / Done.

1015 Agenda topic: Outstanding Item List - Review and Update

Presenter : Robin and Eglin RPMs

Objective : Facilitate the approval of outstanding items by discussing individually and resolving items or making commitments. The list reflected the documents that need review and approval by the EPA and FDEP.

The following commitments were agreed upon by Robert for outstanding items relating to EPA: Approval letter to be sent by 1/9/98 for the COPC document; approval letter for AOC 88 SI report to be sent by 3/1/98; review comments for RCRA 3007 letter with additional AOCs 82, 83, 88, 92, 94, 96, 99, 101, 102, 103, 104, 107, and 108 to by provided by 2/17/98; review comments for PAs on POIs 300-325 by 2/17/98.

The following commitments were agreed upon by Greg for outstanding items relating to FDEP: review comments for AOCs 7, 24, and 88 to be provided by 3/1/98; review comments for RCRA 3007 letter with additional AOCs 7, 24, 82, 83, 84, 87, 88, 92, 94, 96, 99, 101, 102, 103, 104, 107 and 108 to be provided by 3/98; review comments for PAs on POI 300-325 to be provided by 3/98; review comment of Duke Field Bldg. 3057 pipeline with NFA to be provided by March meeting: review comments for SS-01 IM Report by March meeting; review comments for SS-01 Contamination Assessment Report to satisfy RFI requirement by March meeting; review/approval of 2nd qtrly. Monitoring report for ST-60 by March meeting.

1115 Agenda Topic: Tier II Link and METRICS Update

Presenter: Robert Elliott and Richard

Objective: Information Transfer

METRICS is a measuring stick for demonstrating to Tier II and II the positive and negative attributes of the partnering process. Robert Elliot provided a handout of the November Tier II meeting minutes. Robert Elliott described the five pages of METRICS as #1- Summary of IRP status, #2 - Partnering affects on document review/approval, #3 - Cost partnering vs. Savings of partnering, #4 - Attendance of Tier II link, #5 - Programmed, validated and obligated funds summary. Much of the conversation focused on how to quantify the savings of partnering. Two action items resulted from the agenda topic.

Action Item 9801-A01- operate a METRICS subcommittee headed by Richard with Jim and Craig supporting to complete Draft METRICS for Tier I review by next meeting.

Action Item 9801-A02- The team is to review past partnering decisions resulting in cost savings or additional costs to assist in the development of the METRICS data being comprised by the subcommittee. Due to Richard by February.

1145 to 1245 Lunch Break

1245 Agenda Topic: Additional Tier II discussions

Presenter: Robert Elliott

Objective: Informational

Robert Elliott discussed the upcoming partnering training scheduled for February 9-11 to identify who would be attending from the Eglin team. The persons planned for attendance would be Sylvia, Jim and Eugene (after the formal vote is conducted for Eugene). Don Strickland may also be included for the training due to frequent guest status. Robert Elliott asked about the availability of Eglin success stories. The team described the use of ESOPs and will be giving Robert a copy of the Visitors Guide Information document which elaborates on the partnering process for the team.

1315 Agenda Topic: Team Communication

Presenter: Elle

Objective: Team Development - Approach for conflict resolution.

Elle described the do's and don'ts for roles and individuals. The issues don't always make it to the table. However, stability and confidence level can move to a "pinch" which can develop into a crunch. A graphical depiction of conflict resolution was presented that included: stalemate, termination and reconciliation under duress. The discussion centered on the identification of a pinch point as the time for intervention of larger problems.

Planned Reconciliation

- Awareness - notice the "pinch"
- Courage - Support hearing "bad news"
- Common Skills - How to listen/speak under pressure
- Commitment - Work things out and take the time think things out

Partnering meetings at 2 month intervals could result in additional "pinch" points.

When to deal with a "pinch"

Questions to be asked:

How important is the issue?

How important is the relationship?

What will happen if I don't?

How will I feel if I don't share my thoughts?

Team communication was closed out with the request for Eugene Liu to provide the team some background information on himself. It appears that Eugene is the ACOE designated replacement for Mike Fillips and a very qualified and personable individual. The team voted Eugene in as a partnering team member.

1430 **Agenda Topic:** Group II Natural Attenuation Study (NAS)

Presenter: Don Strickland

Objective: Consensus on comments and agreement on COPCs/geochemistry and which wells will be sampled.

Don discussed the results of the four quarter study on six sites in an attempt to narrow down what will be for in the natural attenuation study. Sites discussed were LF-05, FT-27, FT-28, LF-08, OU-1 and FT-39.

Data package provided for LF-05 included maps and quarterly baseline sampling program. The data showed correlation of wells with low dissolved oxygen which indicated bio-activity with the wells containing COPCs. The recommendation for the site was sampling of 7 shallow, 7 intermediate and 1 deep well. **Consensus 9801-C01** on the recommended sampling plan was obtained.

Data package provided for FT-27 included maps and quarterly MW data. Six of nine shallow wells were dry. The discussions focused on the idea of evaluating the site as a POL site per the new State criteria 66770 and getting 3rd quarter (wet season) monitoring well data for the shallow wells. The vote is pending the outcome of the site evaluation and sampling data.

Data package for the LF-08 Receiver Area Landfill was provided. The objective was the consensus on NFA for groundwater. The Team reached a **consensus 9801-C02** on NFA for groundwater at the site. (cost savings of partnering to include reduction of 20 year GW monitoring program)

Data for OU-1 was discussed regarding 23 MW selected for 2nd quarter monitoring based on 1st quarter results. The recommendation was to analyze samples from selected shallow and deep MWs for VOCs. Analyze 1 shallow well for lead and 10 wells for magnesium and iron. The team reached a **consensus 9801-C03** on the recommended action.

Data for FT-39 was provided which supported the recommendation to sample all but the upgradient well. **Consensus 9801-C04** to go ahead with the sampling of the proposed wells. An action item was identified for Ralph to talk to John Krishack about rolling FT-39 over to Hurlburt Field.

1645 Due time constraints the discussion of SS-33 will be carried over to Wednesday morning.

What worked today: Tech areas were well done, Humor was good, Timeframes were realized, Best Tier II update in a while and eagerness.

What didn't work well today: Lack of prep by team members due to the holidays, Administrative issues were tougher, Lack of resolution on some mechanics and not enough time for Tier II interaction.

Wednesday, January 7, 1998

0830 Check-in

0845 Agenda Topic: Presentation of SS-33 MW sample results

Presenter: Don Strickland

Objective: Resolve NFA for SS-33.

Consensus 9711-C02 was made on the plan to sample MW SS-33-03 and if the metals results indicate concentrations less than FDEP MCL's the site goes NFA and if it is over FDEP MCL's it will have Institutional Controls placed on the site. Don presented the analytical results for MW SS-33-03 that indicated non-detect metals below the FDEP MCL's and therefore proposed NFA for the site. **Consensus 9801-C05** was obtained for NFA on SS-33.

0845 Agenda Topic: COPC Document

Presenter: Robin

Objective: HQ Clarification and consensus on the screening value.

Robin expressed the concern that HQ screening should have been thought through its use in association with the COPC determination process. The problems arise between the investigative actions carrying forward constituents that are risk based vs. investigative. After discussion of the need for the risk based screening at 0.1 the decision was made to continue to screen at 0.1. However, a risk management decision at the SI phase will utilize a HQ of 1.0 for progressing forward as a COPC. The modification of the COPC screening table will have columns to include both the 0.1 screen and the 1.0. This will allow the review of the pattern of 0.1 excedances for information purposes and risk management decisions. **Consensus 9801-C06** to modify the COPC document with the narrative to reflect the screening rationale as discussed.

0950 Agenda Topic: AOC No. 24 (C-52A) Aerial Over Spray Site

Presenter: Alec McBeth

Objective: Develop necessary actions to reach site closure

Data package was provided with site history. The SI conducted by RUST was expanded beyond the original boundaries of preliminary investigations in 1992/93. The area being investigated is a very large spray field for aircraft emptying (approximately 1 mile wide and is part of an active bombing range. No COPCs were identified in the GW. Discussions included four EPA comments which will addressed in an upcoming letter. **Consensus 9801-C07** on NFA.

1015 Agenda Topic: AOC No. 82 (A-15) Compound Disposal Area

Presenter: Alec McBeth

Objective: Consensus on the NFA recommended in the SI Report.

Data package provided information from the performance of geophysics, DPT and field screening with immunoassay test kits. Three MWs were installed. Geophysics were

limited in areas of buried metal debris. GW was 7-10 feet bls with no field screening hits. The only excedances were essential nutrients in the GW analyses. The report is currently included as part of 5 AOCs submitted for review.

1030 Agenda Topic: Water Towers SI Procedural Refresher Discussion

Presenter: Richard

Objective: Approve use of 2 page Work Plans for 12 water tower sites.

The use of standardized Water Tower Work Plans was approved by **consensus 9801-C08** based upon the demonstrated experiences on water tower SI's and corrective measure projects.

1035 Agenda Topic: LF-51

Presenter: Jim

Objective: Address questionable historic data and data gaps.

The plan is to go forward. However, there are questions that are giving cause to reevaluation of the remedial options specified in the focused CMS for the site. The comments on the focused CMS report will be addressed and revised accordingly to include:
Area Controls

- The upland area will have signs posted and a soil cover with native vegetation may be implemented pending results of eco-risk validation.
- The steep area of the site will utilize engineering controls.
- The medium slope areas will be evaluated and appropriate corrective measures implemented.
- Implement native vegetation controls/restoration program.

Sediment monitoring will consist of 3 samples annually and no GW monitoring.

The LF-51 site will require the submittal of a concise work plan that outlines the desires for accomplishing the end objective.

1145 - 1245 Lunch Break

1245 Agenda Topic: SS-45 RFI/ICM Report

Presenter: Steve Williams

Objective: Overview and discussion of EPA and FDEP review comments.

Data packages provided the overview information on the site which still has elevated PCB concentrations at the building foundation and elevated 1,1-DCE in GW. Discussion of EPA and FDEP review comments was conducted as an active review since EPA and FDEP had not seen the comment responses from Eglin. The discussions shifted towards resolution and close-out options for the site. **Consensus 9801-C09** on NFA on any additional Corrective Measures with the following actions to be implemented:

- Provide land use constraints, to prevent residential development and use of the sand & Gravel aquifer.
- Implement a semi-annual groundwater monitoring program for two years for PCB's and 1,1-DCE.

1400 Agenda Topic: ICM For Site OT-83 Cattle Dipping Vat at Picosin Pond.

Presenter: John Swenfurth

Objective: Update and gain consensus on the limits of excavation to be done.

The data package provided the summarized details on the arsenic delineation efforts to date. The recommendation is to excavate to 10 feet deep using a clean-up goal of 23 ppm Arsenic (EPA Risk Based Concentration). FDEP only wanted 2 feet of soil excavated and the removal of the vat. Eglin wants to do whichever ICM allow the elimination of institutional controls. A teleconference between FDEP and Eglin will provide information on other precedent setting decisions on similar projects (January 16). **Consensus 9801-C10** was obtained for the dual decision as follows: Excavate as planned (10 feet) with no institutional controls or excavate to the FDEP level with institutional controls.

1501 Agenda Topic: SS-86 Exterior Electric Shop/Entomology Shop

Presenter: John Swenfurth

Objective: Obtain input on the proposed MW and soil sampling locations.

General site information included lots of RFI DPT data which indicated COPCs (TCE, DCE,VC and Benzene) in groundwater. Currently the GW contaminant delineation effort is partially complete and complicated by the fact that the site is between OU-1 and POI 301. The only addition to the planned recommendations for the site was that additional DPT be performed to continue boundary delineation efforts. **Consensus 9801-C11** for the location of the MW cluster as proposed, Continued DPT use for boundary delineation. **Consensus 9801-C12** for the collection of soil samples, using pesticide field immunoassay test kits and lab verification for pesticides per the RFI Work Plan.

1540 Agenda Topic: SS-26RFI / HHRA / ERA

Presenter: Paul and Don

Objective: Consensus on comments and responses

Brief history of the defoliant loading area at runway included RFI by Parsons with OBG now working on the IM evaluation (CMS completed). Comments have been received from EPA and FDEP on the CMS. However, the responses to comments have not been reviewed by the agencies yet. A teleconference is scheduled for reveiw of the response to comments of February 13th at 1000. Teleconference participants to include Greg, Robert, Jim, Paul and Don. The CMS comments will be E-mailed to Greg and Robert by January 9th. The issue of erosion control at the site was discussed. The proposed approach is estimated to be $30-40K and includes grouting of the pit piping, core the floor (sample) and backfill the pit,

repair the terrace, install silt fence and stone and removal of IDM drums. A letter work plan will be provided by January 30th.

1611 Close-out

What worked today: Beginning to focus on systems thinking, Group dynamics helped on LF-51 decisions, best meeting yet, greater comfort among team members.

What didn't work today: Needed more preparation on OT-83, SS-26 missed the mark, less formal consensus, not completely prepared.

THURSDAY, January 8, 1998

0830 **Check-in** Guest Jean Bossart from CH2M in attendance.

0840 Agenda review

0845 **Agenda Topic:** Land Use Constraints

Presenter: Jim

Objective: Informational

Land use constraints are proposed for sites with no current risks and have limited future risks. The process of amending the permit is in place. The plan for using land use constraints as a remedial alternative is to be briefed to the commander and the planning committee. The briefing will focus attention on the idea that land use constraints concentrate on what is causing the problem. The briefing will occur at the EPC meeting. Jim will develop a Draft land use constraint procedure and a draft statement of basis that emulates the Shaw AFB plan.

0855 **Agenda Topic:** Risk Procedure Document

Presenter: Paul

Objective: Informational

General philosophy was discussed. FDEP and EPA agree to disagree. EPA uses 10 -4 and FDEP uses 10 -6. CERCLA guidelines for RGO start at 10 -6 and use risk management as needed. Need to consider this in remedial design. If it is an IM the use of presumptive remedy should follow. Active areas have risk zones such as UXO which would be addressed under the range rule. Reminder that there is a 10% data validation for lab QC for risk assessments. The use of area weighted averaging is to be provided in the uncertainty section. The Eco-risk and HHRA procedures will be addressed in the guidance document which will be sent out 2 weeks prior to the March meeting.

0940 Agenda Topic: Water Tower Sites Review

Presenter: Mike Doran and Craig

Objective: Consensus on site status for ST-77, ST-78 and ST-79

Mike Doran provided handouts of presentation material for each of the sites as they were discussed.

Consensus 9801-C13 for NFA at ST-77.

Consensus 9801-C14 for NFA at ST-78.

Consensus 9801-C15 for NFA at ST-79.

Successful work efforts at these sites such as perimeter air monitoring and personnel monitoring, and visual observations that correlate with analytical data can be utilized at other water tower sites. The plan is to submit ICM reports stating NFA in clusters as completed.

1105 Agenda building for the March meeting at Eglin AFB.

Leader is Sylvia.

Timekeeper is Robert.

Scribe duties are Patricia's

The host will be Craig.

The 3 day format will have a 1200 start on the first day and a 1700 finish. Days 2 and 3 will have a 0830 start and finish at 1630 each day. (March 9-11, 1998)

Agenda Item	Estimated Time	Presenter
ESOP discussion	1 hour	Richard/Robin
Team Membership/Restructuring	1.5 hour	Steve
LF-08 & LF-05 Sediment Issue	2 hours	Paul/Ralph
DP-84 & DP-97	1 hour	Craig
Team Decision Process	2 hours	Paul
Risk Assessment Document	1 hour	Paul
5 SIs and 5 POIs (water towers)	2 hour	Richard/Robin
Team Building	1 hour	Elle
Sribe Guidance	0.5 hour	Team

Metrics subcommittee update	1 hour	Richard

1140 Action Item review from the meeting:

Action Item No.	Responsible Team Member	Due Date	Action Item
9709-A11	Richard	Multiple Dates	Develop "Final" Eglin Partnering Visitor Handbook (include Tier deliverables). Tier I Feb. 13th, Tier I comments by Feb. 20th and send to Tier II by March 2nd.
9711-A10	Paul	Jan. 23rd	Send out Volume I of Group II Generic Basewide Eco-Risk documents.
9711-A08	Richard	Feb. 98	Provide the Partnering Team Meeting schedule with names of team leaders, dates and locations.
9801-A01	Richard, Jim & Craig (subcommittee)	March Meeting	Completion of draft Tier II METRICS for review and comment by the Tier I Team. Eglin Team members to identify cost savings that can be attributed to the partnering process.
9801-A02	Team	Feb. 6	Review past consensus and costs to formulate opinions on cost savings that can be attributed to the partnering process.
9801-A03	Ralph	Jan. 98	Discuss the Roll-over of FT-39 to Hurlburt Field with John Krischak.
9801-A04	Greg	Jan. 98	Greg is to e-mail Ralph regarding the final remedy decision for OT-83 (Cattle Dipping Vat).
9801-A05	Greg, Paul, Rob, Jim, Don	Feb. 13 10:00 EST	Conference call to discuss the path forward on SS-26. Topic will be response to CMS comments that are to be e-mailed Jan. 9th.
9801-A06	Jim & Patricia	March Meeting	Develop/present "draft" Land Use Constraint procedures. (i.e. Draft SB for Hurlburt landfills and Draft planning document)

1230 Close Out

Pluses from the meeting	Minuses from the meeting
Richard's effort on Agenda	Humor was dead

Mike's presentations

Great graphics material

Several cost savings success stories

Highly productive - cutting agenda time on the last day

Scribe was dead

ATTACHMENT 2

TABLE 3.2
ANALYTICAL RESULTS FOR C-52 AERIAL OVERSPRAY AREA (F-7)
EGLIN AFB, FLORIDA

Parameter	Method	Units	Detection Limit	ARAR[1] Federal	ARAR[1] State	Soil EGHO-F7-D2 8427.13	Soil EGHO-F7-D4 8427.14	Soil EGHO-F7-D6 8427.15	Soil EGHO-F7-D20 8427.16
Arsenic	SW7060	mg/kg	2.0	-	-	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.81	0.80	0.82	0.84

Parameter	Method	Units	Detection Limit	ARAR[1] Federal	ARAR[1] State	Soil EGHO-F7-C1 8427.17	Soil EGHO-F7-C3 8427.18	Soil EGHO-F7-C5 8427.19	Soil EGHO-F7-C7 8427.20
Arsenic	SW7060	mg/kg	2.0	-	-	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.84	0.89	0.85	0.93

Parameter	Method	Units	Detection Limit	ARAR[1] Federal	ARAR[1] State	Soil EGHO-F7-C9 8427.21	Soil EGHO-F7-B2 8427.22	Soil EGHO-F7-B4 8427.23	Soil EGHO-F7-B6 8427.24
Arsenic	SW7060	mg/kg	2.0	-	-	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	.3025	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.87	0.90	1.1	0.97

TABLE 3.2 –Continued
ANALYTICAL RESULTS FOR C-52 AERIAL OVERSPRAY AREA (F-7)
EGLIN AFB, FLORIDA

Parameter	Method	Units	Detection Limit	ARAR[1] Federal	ARAR[1] State	Soil EGHO-F7-B8 8427.25	Soil EGHO-F7-B10 8427.26	Soil EGHO-F7-A1 8427.27	Soil EGHO-F7-A3 8427.28
Arsenic	SW7060	mg/kg	2.0	-	-	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.91	0.84	0.88	1.2

Parameter	Method	Units	Detection Limit	ARAR[1] Federal	ARAR[1] State	Soil EGHO-F7-A5 8427.29	Soil EGHO-F7-A7 8427.30	Soil EGHO-F7-A9 8427.31	Soil EGHO-F7-C17 8427.32
Arsenic	SW7060	mg/kg	2.0	-	-	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.92	0.96	0.95	0.82

Parameter	Method	Units	Detection Limit	ARAR[1] Federal	ARAR[1] State	Soil EGHO-F7-C15 8427.33	Soil EGHO-F7-C13 8427.34	Soil EGHO-F7-C11 8427.35	Soil EGHO-F7-B18 8427.36
Arsenic	SW7060	mg/kg	2.0	-	-	3.3	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.95	0.93	1.1	0.95

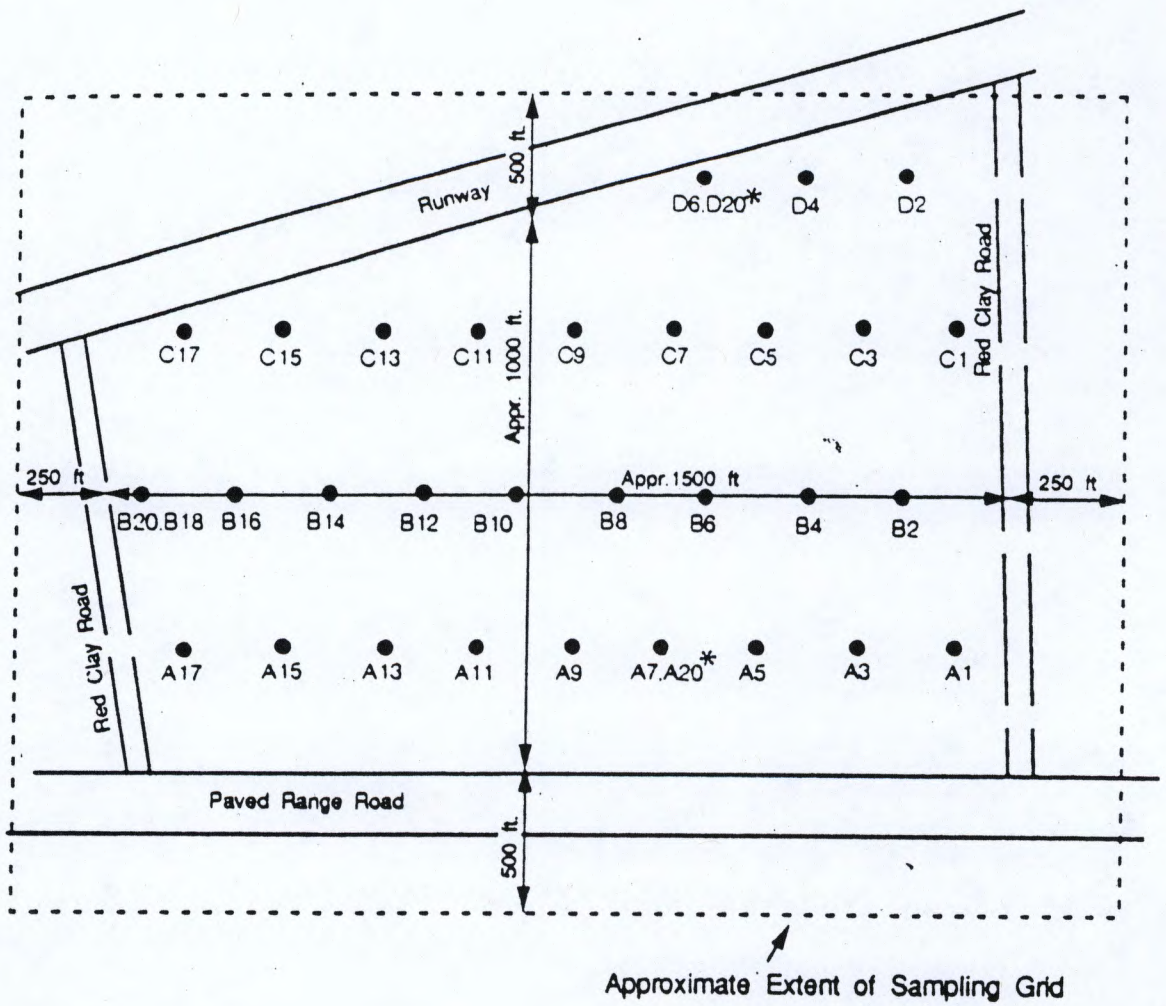
TABLE 3.2 –Continued
ANALYTICAL RESULTS FOR C-52 AERIAL OVERSPRAY AREA (F-7)
EGLIN AFB, FLORIDA

Parameter	Method	Units	Detection Limit	ARAR(1) Federal	ARAR(1) State	Soil EGHO-F7-B16 8427.37	Soil EGHO-F7-B14 8427.38	Soil EGHO-F7-B12 8427.39	Soil EGHO-F7-B20 8427.40
Arsenic	SW7060	mg/kg	2.0	-	-	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.86	0.77	0.93	0.96

Parameter	Method	Units	Detection Limit	ARAR(1) Federal	ARAR(1) State	Soil EGHO-F7-A17 8427.41	Soil EGHO-F7-A15 8427.42	Soil EGHO-F7-A13 8427.43	Soil EGHO-F7-A11 8427.44	Soil EGHO-F7-A28 8427.49
Arsenic	SW7060	mg/kg	(2)	-	-	ND	ND	ND	ND	ND
2,4-D	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND	ND
2,4,5-T	SW846-8150	mg/kg	(2)	-	-	ND	ND	ND	ND	ND
2,3,7,8-TCDD	SW846-8280	µg/kg	(2)	-	-	ND	ND	ND	ND	ND
Moisture	ASTMD2216	%	NA	NA	NA	0.82	0.92	1.0	0.99	1.0

(1) Applicable or relevant and appropriate requirements.
(2) See detection limits in Table 3.8.
F7 C-52 Aerial overspray area.
ND Not detected above detection limit.
NA Not applicable.
Note Numbers provided below sample numbers are the laboratory assigned identification numbers.

C-52A AERIAL OVERSPRAY AREA (F-7)
SOIL SAMPLING LOCATIONS
EGLIN AFB, FLORIDA



SOURCE: Installation Restoration Program, ITIR for Herbicide Orange Sites, ES, March 1992

Don D. Harrison

DETERMINATION OF ARSENIC CONCENTRATION OF SOIL SAMPLES FROM TEST AREA C-52A

PREPARED BY:

CADET STEPHEN A. FRANGOS

14 July 1978

TABLE OF CONTENTS

INTRODUCTION

In June and July of 1978, the Environics Office performed arsenic analyses on soil samples from a one square mile instrumented test grid in the center of Test Area (TA) C-52A, Eglin Air Force Base Reservation, Florida. Test Area C-52A received vast quantities of military herbicides from 1962 to 1970 during testing of aerial dissemination equipment (1). One of those herbicides, Defoliant Blue*, contained arsenic in the forms of sodium cacodylate ($Na\ [CH_3)_2AsO_2]H_2O$ and cacodylic acid ($(CH_3)_2AsO_2H$). In order to determine residual arsenic levels in the soil of TA C-52A, 97 soil samples (94 from the test area, and 3 controls) were dried, acid digested, filtered, and analyzed using an atomic absorption spectrophotometer**. The atomic absorption spectrophotometer, capable of detecting arsenic at a wavelength of 193.7nm, could not distinguish between the inorganic and organic forms of arsenic in the soil. Rather, the total arsenic concentration in the soil was measured and subsequently recorded.

DESCRIPTION OF TEST AREA

Test Area C-52A, a grassy, man-made plain, covers approximately 3 square miles (Figure 1). The instrumented one square mile test grid which was used for herbicide spray equipment testing is divided into 400 by 400 foot sections by permanent markers. The 47 blackened circles in Figure 2 illustrate the location of the sampling stations used in this experiment.

Figure 3 shows the aircraft flight paths (of the planes testing herbicide spray equipment) and the quantities of herbicide deposited on the instrumented test grid and a non-instrumented grid (Grid 1) immediately south of the surveyed area. The exact amount of herbicide sprayed on each sample plot cannot be

* (Appendix A)
** (Appendix B)

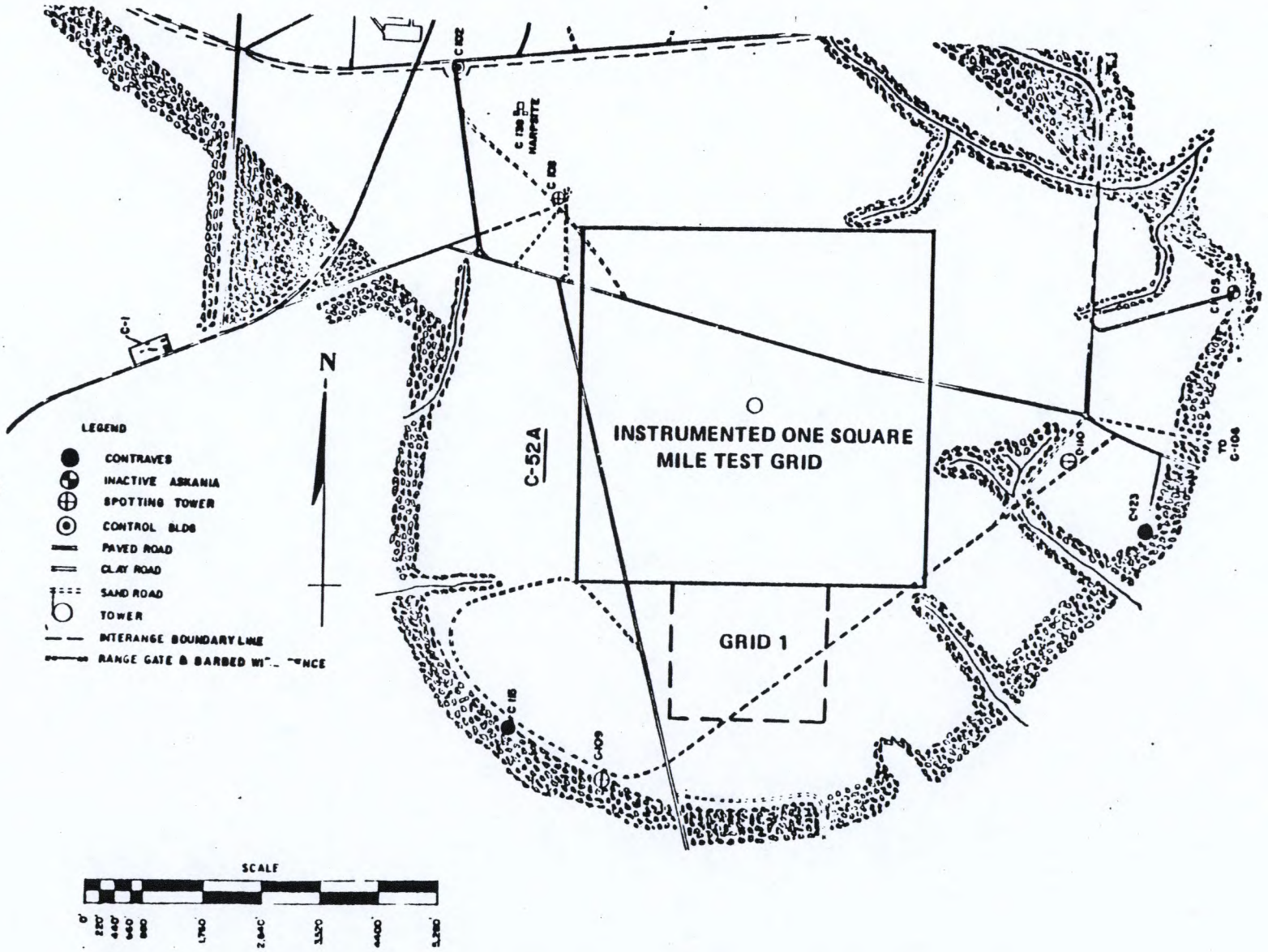


Figure 1. Map of Test Area C-52A, Eglin AFB Reservation, Florida

determined since it varied according to winds and flight conditions, as well as on herbicide discharge rate.

MATERIALS AND METHODS

Collection of Soil Samples: Ninety-seven soil samples were collected for experimental analyses on 6-7 June 1978. The 94 samples from the one square mile instrumented test grid consisted of two core samples taken from each of 47 different sites. The core samples from each site were labeled a's for the depth of0-8 inches, and b's for the depth of 8-16 inches. Controls were later collected from along the Field 4 Road (approximately 12 miles west of TA C-52A, and one mile northeast of Beal Parkway).

Laboratory Preparation: Initially, the soil samples were dried in two stages: first, from 2 to 14 days in the Environics Office's Greenhouse (50C); and then. for 6 hours in an oven (105C). Next, each sample was thoroughly mixed to insure soil uniformity throughout each 8-inch core sample.

Preliminary Extraction Techniques: Fifty grams of one soil sample were weighed and placed in each of six 200ml beakers. Acid digestion of the soil samples was performed in order to free arsenic which might have been bound in organic compounds. Three acids and/or acid combinations were compared to see which extracted the most arsenic from the soil. The following are the digestion alternatives that were compared:

30ml concentrated HCl

10ml concentrated HCl and 5ml concentrated HNO_3

10ml concentrated HCl and 2ml concentrated H_2SO_4

The volume in each beaker was brought up to 75ml with distilled water. Then, for two hours, the beakers were heated on hot plates at the condensation temperature of the samples (100C) to minimize arsenic loss. After cooling, the

six samples were filtered through funnels lined with 12.5cm, 6 Qualitative Whatman filter paper. The filtered soil was then rinsed several times with distilled water and drained into 100ml volumetric flasks. Next, one gram of potassium iodide (KI) was added to the filtrate of each sample in order to reduce the arsenic in the samples from a valence of +5 to +3. A better response is obtained on the atomic absorption spectrophotometer if the arsenic is in the +3 form. After adding the KI, the samples were placed in a water bath at 100C to speed up the reduction process. After 30 minutes in the water bath, the samples were cooled and their volumes increased to 100ml by adding distilled water. The samples were then run on the atomic absorption spectrophotometer.

There existed doubt as to the necessity of heating the sample during acid digestion. As a result, fifty grams of one soil sample were weighed and placed in each of two 200ml beakers. The samples were digested with 30ml HCl. The only difference in their preparation was that one sample was heated for two hours on a hot plate during digestion (the other was cold digested).

The results of the above two preliminary extraction techniques can be found in Table 2.

Final Extraction Techniques: Based on the findings from the preliminary extraction techniques, it was decided to use 25 grams of soil and hot digest the samples with 30ml HCl. Twenty-five grams of each soil sample were weighed into 200ml beakers. Thirty ml of HCl were added to each beaker and the volume was brought up to 75ml with distilled water. For two hours the samples were

heated on hot plates. After cooling, filtering, and rinsing each sample, one gram of KI was added to each 100ml volumetric flask. After thirty minutes in the water bath, the samples were cooled and their volumes increased to 100ml with distilled water. Each sample was then analyzed using an atomic absorption spectrophotometer.

NOTE: For the control samples (#1--0-8 inch core sample; #2--0-8 inch core sample; #3--8-16 inch core sample) 50-gram samples were prepared and analyzed.

Atomic Absorption Parameters and Techniques - Experimental: The samples were analyzed on a Perkin-Elmer Model 603 Atomic Absorption Spectrophotometer equipped with a Deuterium Background Corrector and an HGA-2200 Graphite Furnace. The results were recorded on a Perkin-Elmer Model 056 Stripchart Recorder. Instrumental conditions are shown in Table 1.

TABLE 1

INSTRUMENTAL CONDITIONS

Wavelength	193.7nm
Spectral slitwidth	0.7nm
Core gas	Argon
Chart Recorder	
Range	10mV
Chart Speed	20mm/minute
HGA 2200 Controller	
Flow Time	7 Norm
Recorder	Auto
*Sample size	50µl
Source	Electrodeless discharge lamp, Perkin-Elmer
Interval	10 second
Signal/Mode	Conc./Peak Area

TIME AND TEMPERATURE SETTINGS

	Temp (C)	Time (second)
Drying	105	50
Charring	500	60
Atomizing	2650	10

*In addition to the 50µl sample, 50µl of a 1000ppm nickel nitrate were injected on each run to stabilize the sample and prevent any arsenic loss during the charring period.

REAGENTS

Reagent A.C.S.
conc. Hydrochloric Acid
Fisher Scientific Company

Reagent A.S.C.
conc. Nitric Acid
Fisher

Certified Atomic Absorption Standard
Arsenic Reference Solution 1000ppm

Nickel Standard
1000ppm Ni
Harleco

Lamminckrodt
conc. Sulfuric Acid
H_2SO_4
Analytical Reagent

Potassium Iodide
'Baker Analyzed' Reagent

GLASSWARE

All glassware was washed in soapy water, rinsed with top water, acid washed with concentrated nitric acid, and rinsed with distilled water.

RESULTS AND DISCUSSION

The purpose of this experiment was to gather baseline data on the arsenic concentrations in the soil of TA C-52A. The results, presented in Tables 2 and 3, and in Figure 4, support a number of conclusions.

First, the comparison of acid digestion alternatives in Table 2 suggests that the effectiveness inextracting arsenic with a single acid (30ml conc. HCl) is comparable to that of a double-acid (10ml conc. HCl and 5ml conc. HNO_3) extraction. Since the soil in TA C-52A is mainly sand and does not

TABLE 2

PRELIMINARY EXTRACTION TECHNIQUES COMPARISON

OF DIFFERENT ACID DIGESTION ALTERNATIVES

ACID USED IN DIGESTION	TOTAL ARSENIC CONCENTRATION (ppm)	AVERAGE TOTAL ARSENIC CONCENTRATION (ppm)
30ml HCl	0.9228 0.8860 0.8710	0.8933
10ml HCl and 5ml HNO_3	0.9192	0.9192
10ml HCl and 2ml H_2SO_4	0.7888 0.8130	0.8009

COMPARISON OF HOT AND COLD

DIGESTION ALTERNATIVES

DIGESTION ALTERNATIVE	TOTAL ARSENIC CONCENTRATION (ppm)	AVERAGE TOTAL ARSENIC CONCENTRATION (ppm)
Hot	2.590 2.510 2.830	2.643
Cold	1.178 1.048 1.330 1.026	1.194

have many organic compounds that need to be digested, strong acids (like perchloric acid) or acid combinations are not required. Consequently, 30ml concentrated HCl were used in all soil sample digestions. Further, data in Table 2, comparing hot and cold digestion alternatives, resulted in the heating of all digesting soil samples.

Table 3 demonstrates a striking difference in arsenic concentrations between the soil from TA C-52A and the control group. The arsenic concentrations in the latter (0"-8" core sample--0.0794 ppm; 8"-16" core sample--0.1204 ppm) were much lower than those for TA C-52A. The soil-arsenic concentrations for TA C-52A displayed much variation.

For the 0"-8" core samples, the arsenic concentration ranged from 3.608ppm to 0.487ppm. For the 8"-16" core samples, the arsenic concentrations ranged from 4.141ppm to 0.212ppm.

Possible explanations for the differences in arsenic concentrations in the soil of TA C-52A are threefold.* First, the winds and flight conditions (when the herbicides were sprayed) as well as the herbicide discharge rate make it virtually impossible to determine how much herbicide was sprayed on each sample plot. Second, winds in the test area have undoubtedly shifted the topsoil in the last eight years. Arsenic that was sprayed in one area could possibly have been blown to another area. This could account for relatively high arsenic concentrations in areas off the flight path of herbicide-spraying aircraft. Third, in areas where the arsenic concentration is higher in the 8"-16" core sample than in the 0"-8" core sample, leaching of the arsenic may have occurred.

* See Note on Page 10

In all of this, one thing is for sure: subsequent study of TA C-52A in the form of a topographical survey is necessary to see where possible wind-blowing and leaching may have led to the results in Tables 2 and 3, and Figure 4 (the plot of arsenic concentrations on the sampling grid). NOTE: A fourth explanation is that not all the permanent sampling stations were sampled.

TABLE 3

ARSENIC CONCENTRATIONS IN THE SOIL CORE SAMPLES
Samples identified by the letter a were taken from 0-8 inch depths and those identified by b were taken from 8-16 inch depths.

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STANDARD DEVIATION
A8			
a.	1.0650	1.0870	0.1313
	1.1060		
	0.9290		
	1.2480		
b.	2.7150	2.7460	0.0305
	2.7760		
	2.7470		
A9			
a.	1.8720	1.9043	0.0954
	2.0200		
	1.7940		
	1.9310		
b.	2.6508	2.6741	0.0300
	2.6636		
	2.7080		
A10			
a.	1.3140	1.2938	0.1036
	1.3050		
	1.2320		
	1.1710		
	1.4470		
b.	1.5120	1.5715	0.2358
	1.6920		
	1.8120		
	1.2700		

TABLE 5 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STANDARD DEVIATION
B4			
a.	0.5016	0.4873	0.0124
	0.4800		
	0.4804		
b.	0.7404	0.7901	0.0960
	0.9008		
	0.7292		
C12			
a.	1.4772	1.5866	0.0847
	1.6500		
	1.6568		
	1.5624		
b.	0.4804	0.4675	0.0348
	0.4280		
	0.4940		
D8			
a.	0.9120	0.8353	0.0746
	0.7630		
	0.8310		
b.	3.0360	3.1550	0.1378
	3.1230		
	3.3060		
D9			
a.	1.5576	1.4976	0.0888
	1.5396		
	1.3956		
b.	3.1090	3.4993	0.2743
	3.7000		
	3.6810		
	3.5070		

TABLE 5 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (µg/g)	MEAN (µg/g)	STD. DEV.
D10			
a.	1.1510 1.0760 1.0970 1.0360	1.0900	0.0479
b.	1.2288 1.2344 1.1432	1.2021	0.0511
E13			
a.	1.0380 1.0820 1.0580	1.0593	0.0220
b.	0.5148 0.7104 0.6440 0.5664 0.5740	0.6019	0.0761
F3			
a.	1.2612 1.2700	1.2658	0.0059
b.	0.9210 0.9170 0.9150	0.9177	0.0031
F11			
a.	3.4780 3.6930 3.6530	3.6080	0.1143
b.	2.7760 2.7430 2.8200	2.7797	0.0386
G5			
a.	1.4730 1.4320 1.4290	1.4447	0.0246
b.	1.7690 1.7800 1.7840	1.7777	0.0078

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STANDARD DEVIATION
H6			
a.	1.6508	1.6745	0.0541
	1.7364		
	1.6364		
b.	1.1040	1.1473	0.0599
	1.1628		
	1.2428		
	1.0932		
	1.1336		
H7			
a.	0.5488	0.5327	0.0239
	0.5440		
	0.5052		
b.	0.1968	0.2121	0.0439
	0.2532		
	0.1680		
	0.2640		
	0.1784		
H8			
a.	1.4600	1.5766	0.1583
	1.7510		
	1.4910		
	1.7450		
	1.4300		
b.	2.0060	1.9387	0.0851
	1.9670		
	1.8430		
H9			
a.	2.1560	2.2470	0.0689
	2.3180		
	2.2380		
	2.2760		
b.	1.4920	1.3523	0.1234
	1.2580		
	1.3070		

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STD. DEV.
H10			
a.	3.2540 3.3050 3.1540 3.2170	3.2325	0.0636
b.	0.3916 0.4136 0.4040	0.4031	0.0110
J3			
a.	1.9300 1.9880 1.8520	1.9233	0.0682
b.	2.0600 2.0470 2.0900	2.0657	0.0221
J6			
a.	1.0720 1.0004 1.0724	1.0483	0.0415
b.	1.5980 1.3004 1.5080 1.5688 1.6332	1.5217	0.1319
J7			
a.	1.2636 1.2228 1.2144	1.2336	0.0263
b.	0.9770 0.9810 0.9900 1.0280	0.9940	0.0233

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STANDARD DEVIATION
J8			
a.	1.6248 1.5576 1.5440	1.5755	0.0433
b.	0.7092 0.7172 0.6880	0.7048	0.0151
J9			
a.	1.2240 1.1810 1.1040 1.1110	1.1550	0.0577
b.	2.3924 2.3964	2.3944	0.0028
J10			
a.	1.8332 1.8520 1.6500	1.7784	0.1116
b.	0.8432 0.8344 0.8220	0.8332	0.0107
J13			
a.	1.7670 1.7510 1.8890 1.7440	1.7878	0.0682
b.	2.8008 2.7804 2.8468	2.8093	0.0340
K6			
a.	1.1128 1.1212 1.1104	1.1148	0.0057
b.	0.7656 0.7888 0.7624	0.7723	0.0144

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ALPHA-EMITTER CONCENTRATION (DPM)	MEAN (DPM)	STD. DEV. (DPM)
K7			
a.	2.8700 2.5460 2.4520 2.5360	2.6010	0.1842
b.	1.7680 1.5830 1.7080 1.6660	1.6813	0.0777
K8			
a.	1.0668 0.9900 1.0680	1.0416	0.0447
b.	1.1068 1.1116 1.0920	1.1035	0.0102
K9			
a.	1.8760 2.2430 2.0450	2.0547	0.1837
b.	2.4152 2.3368 2.3188	2.3569	0.0513
K10			
a.	1.3450 1.4630 1.5300 1.6140	1.4880	0.1136
b.	2.9880 2.8730 3.1860 3.3800	3.1068	0.2234
L3			
a.	1.4848 1.5040 1.4688	1.4859	0.0176
b.	3.5120 3.6340	3.6515	0.1141

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	SD
L4			
a.	1.3470 1.3280 1.2790 1.4020	1.3390	0.0508
b.	4.1630 4.3360 3.9240	4.1410	0.2069
L5			
a.	3.5940 3.4430 3.2340 3.1120	3.3458	0.2146
b.	2.1050 2.0560 1.9030 2.0040	2.0170	0.0865
L6			
a.	2.3480 2.4780 2.3040 2.3188	2.3622	0.0793
b.	2.7656 2.6408 2.5232 2.5144	2.6110	0.1181
L7			
a.	1.635 1.658 1.739	1.6773	0.0546
b.	0.6016 0.8196 0.6684 0.5336	0.6558	0.1223

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STD. DEV.
L8			
a.	0.979 1.053 1.090	1.0407	0.0565
b.	3.486 3.172 3.240	3.2993	0.1652
L9			
a.	0.7148 0.6792 0.6720	0.6887	0.0229
b.	3.103 3.006 3.162	3.0900	0.0787
L10			
a.	1.427 1.492 1.501 1.422	1.4605	0.0418
b.	1.075 1.197 1.110 1.118	1.1250	0.0515
L13			
a.	0.981 1.316 1.161	1.1527	0.1677
b.	0.4028 0.3984	0.4006	0.0031
M3			
a.	1.885 1.506 1.637 1.657	1.6713	0.1575
b.	2.181 2.150	2.1655	0.0219

DOCKET NO. 14

F8570024366

TABLE 3. (Cont'd)

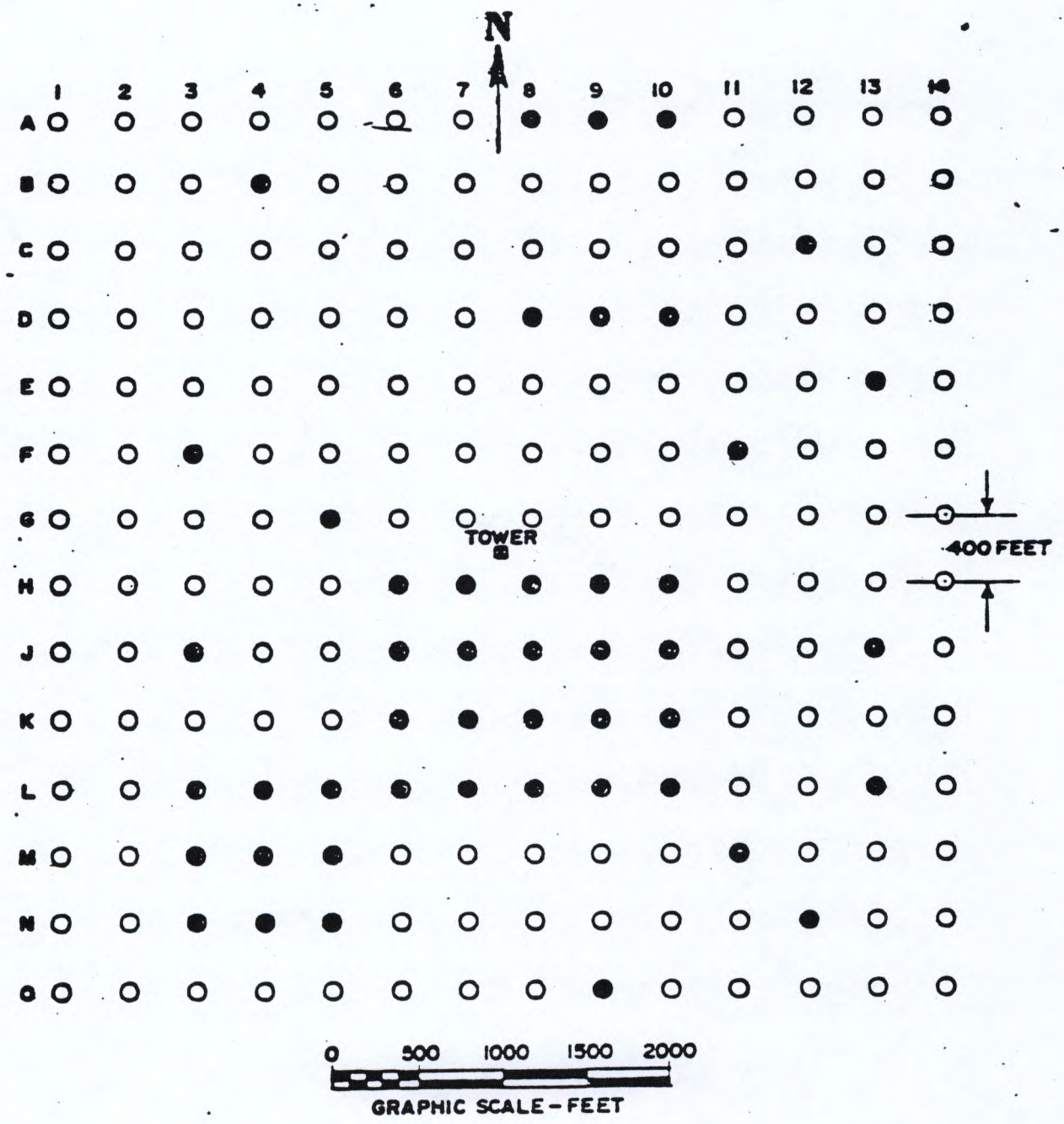
SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	S.D.
M4			
a.	2.254 2.180 2.181	2.3050	0.0424
b.	0.959 0.931 1.008	0.9660	0.0390
M5			
a.	2.439 2.543 2.626 2.611	2.5548	0.0852
b.	1.375 1.769 1.195 1.384 1.715 1.668	1.5177	0.2311
M11			
a.	1.132 0.952 1.142 1.055 1.025	1.0612	0.0788
b.	1.318 1.370 1.365	1.3510	0.0287
N3			
a.	1.642 1.640 1.633	1.6383	0.0047
b.	3.193 3.443 2.952 2.961	3.1373	0.2324

TABLE 3 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STD DEV
N4			
a.	1.371 1.332 1.351	1.3513	0.0195
b.	2.504 2.514 2.628 2.484 2.414	2.5088	0.0772
N5			
a.	1.2692 1.2120 1.1916 1.2188	1.2229	0.0330
b.	1.398 1.461 1.371	1.4100	0.0462
N12			
a.	1.380 1.411 1.386	1.3923	0.0164
b.	2.2288 2.1432 1.9224 1.8840 2.1432 1.9608	2.0471	0.1422
09			
a.	2.5130 2.459 2.506 2.451	2.4823	0.0318
b.	1.3276 1.3272 1.3000 1.3472	1.3255	0.0194

TABLE 5 (Cont'd)

SAMPLE SITE	TOTAL ARSENIC CONCENTRATION (ppm)	MEAN (ppm)	STANDARD DEVIATION
Control			
1	0.0776 0.0802 0.0804	0.0794	0.0016
2	0.1374 0.1198	0.1286	0.0124
3	0.1136 0.1088 0.1144	0.1122	0.0030



• Stations Sampled

DOCKET NO. 14

Figure 2. Location of the Permanent Sampling Stations on the One Square Mile Grid and the Stations Sampled.

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REFERENCES

1. A Survey of Trees on a Herbicide Treated Test Area, Eglin AFB, Florida. AFATL-TR-74-190, Air Force Armament Laboratory, Eglin AFB, Florida. January 1974.

2. Hamme, N.A., J.H. Hunter, and A.L. Young. A Rapid Method for Arsenic Analysis of Soil and Water by Atomic Absorption. AFATL-TR-70-107, Air Force Armament Laboratory, Eglin AFB, Florida. October 1970.

3. Wauchope, R. Don."Atomic Absorption Determination of Trace Quantities of Arsenic: Application of a Rapid Arsenic Generation Technique to Soil, Water, and Plant Samples" Atomic Absorption Newsletter, L5(3), May-June 1976.

4. Wolverton, B.C., and A.L. Young. Military Herbicides and Insecticides. AFATL-TN-70-1. Air Force Armament Laboratory, Eglin AFB, Florida, March 1970.

TOTAL NUMBER OF POUNDS OF HERBICIDE

Years	2, 4-D	2, 4, 5-T	Picloram	Cacodyloc Acid	Arsenic
1968-1970	44,010	38,450	1,501	12,595	1,889
1966-1970	2,784	------	752	1,029	154
1964-1966	35,026	35,026	--------	----------	-------
1962-1964*	87,186	87,186	--------	----------	-------

*Center of flightpaths during this period was located approximately 1,000 feet south of marker N-7.

Solid Lines - Major Flightpaths

Dashed Lines - Minor Flightpaths

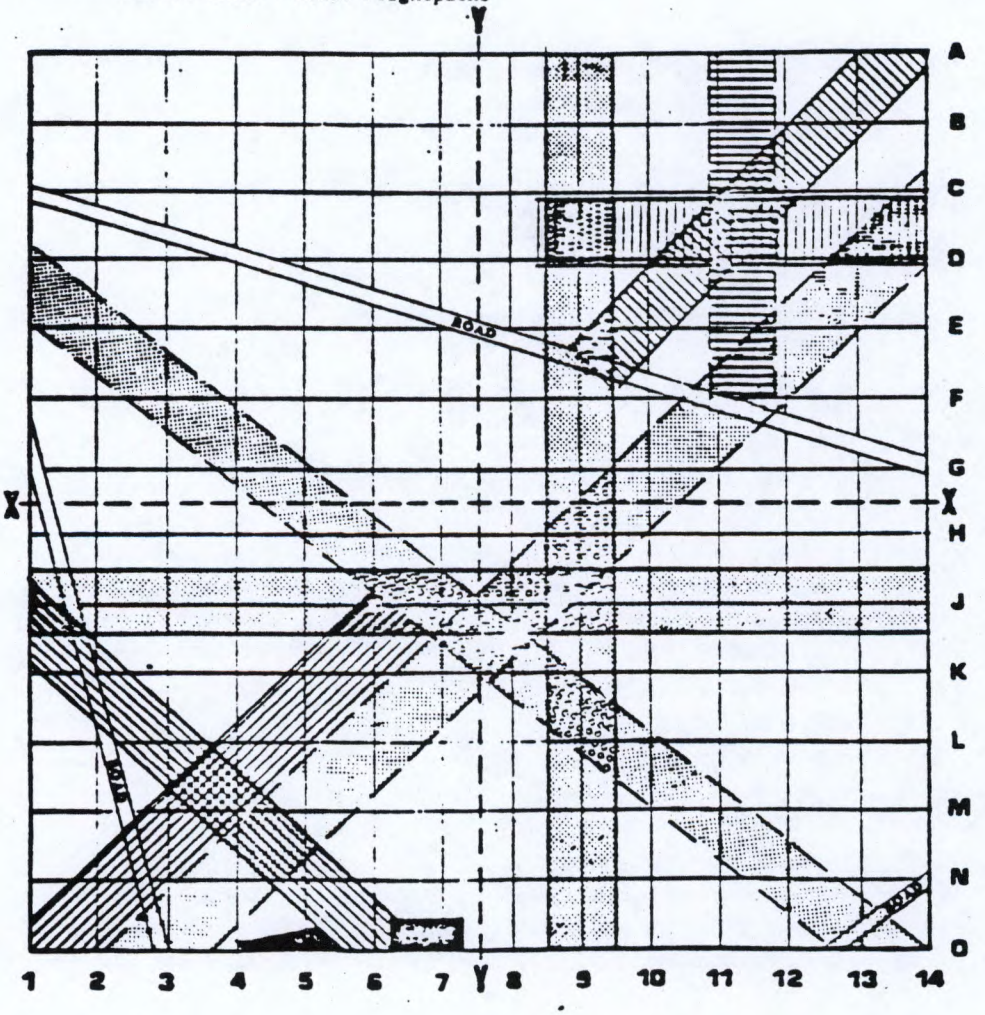

Figure 3. Flight Paths of Herbicide Spray Aircraft

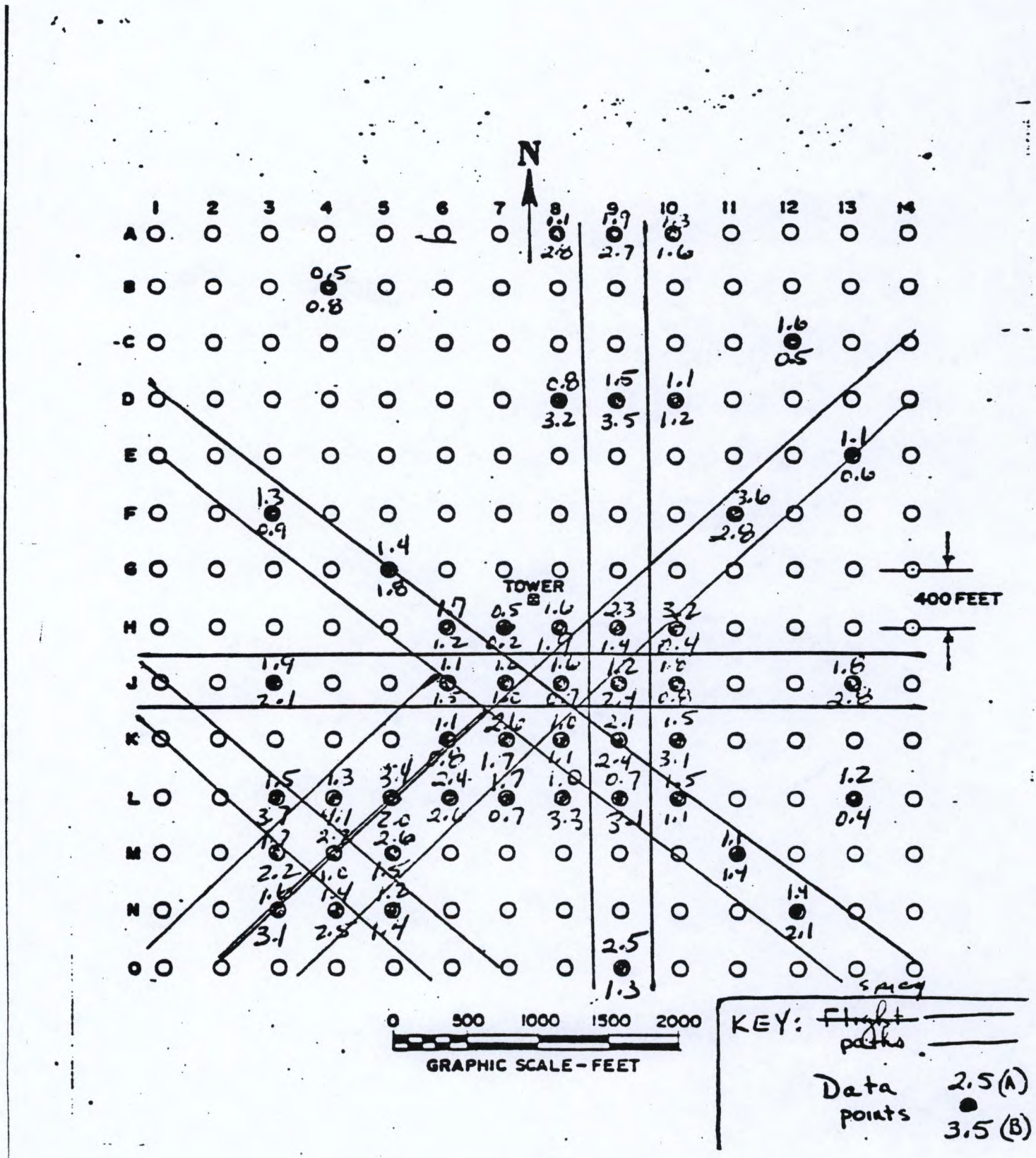

Figure 4. Herbicide Spray Paths and the Residual Arsenic Concentrations in the Soil (rounded to the nearest tenth).

(APPENDIX A: Defoliant Blue

Defoliant Blue, also known as Phytar 560 G (G for Government), is a neutralized liquid compound which contains arsenic in two forms: cacodylic acid and sodium cacodylate (sodium dimethylarsenic acid). The percentages of these two substances, as well as the other constituents of Phytor 560 G are as follows:

Constituent	Percent
Cacodylic acid	4.7
Sodium cacodylate	26.4
Surfactant	3.4
Sodium chloride	5.5
Water	59.5
Antifoam agent	0.5
Total arsenic	14-16 (average 15.4)

APPENDIX B: Atomic Absorption

"Atomic absorption, like other spectrophotometric methods, is a comparison method of analysis. Determinations are made by comparing samples with three or more standards having the same concentration range. The concentration of the element of interest in a sample is determined by measuring the absorption of radiation in atomic vapor produced from the sample at a wave-length that is specific and characteristic of the element. In operation, a hollow cathode light beam is passed through a flame. Samples are aspirated into the flame, where molecules are dissociated into atomic form. While in the flame, most atoms remain in the ground, or neutral, state and, therefore, are capable of absorbing the hollow cathode radiation, only atoms of the element of interest absorb, and the amount of radiation absorbed is proportional to the concentration of the element of interest in the sample. After passing through the flame, the hollow cathode beam passes into a spectrophotometer to be measured; a permanent record of the measurement can be provided by an attached recorder."

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